

293-11



from  
the kilns of

**Pacific Clay Products**

Los Angeles

- PACIFIC Face Brick ☐
- Ornamental Brick ☐
- Roof Tile ☐
- Fire Brick ☐
- Fire Clay ☐
- Flue Lining ☐
- Sewer Pipe ☐
- Drain Tile ☐



# ***Pacific Clay Products***



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Los Angeles - California



293-11

14 27



# PACIFIC

## FACE BRICK

### CATALOG

WIRE CUT *and* RUFFLED FACE BRICK  
ENAMELED BRICK ... PRESSED BRICK  
ORNAMENTAL *and* GLAZED BRICK  
LOS NIETOS QUARRY TILE...MORTAR  
COLOR ... MANTEL *and* HEARTH TILE



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## *Pacific Clay Products*

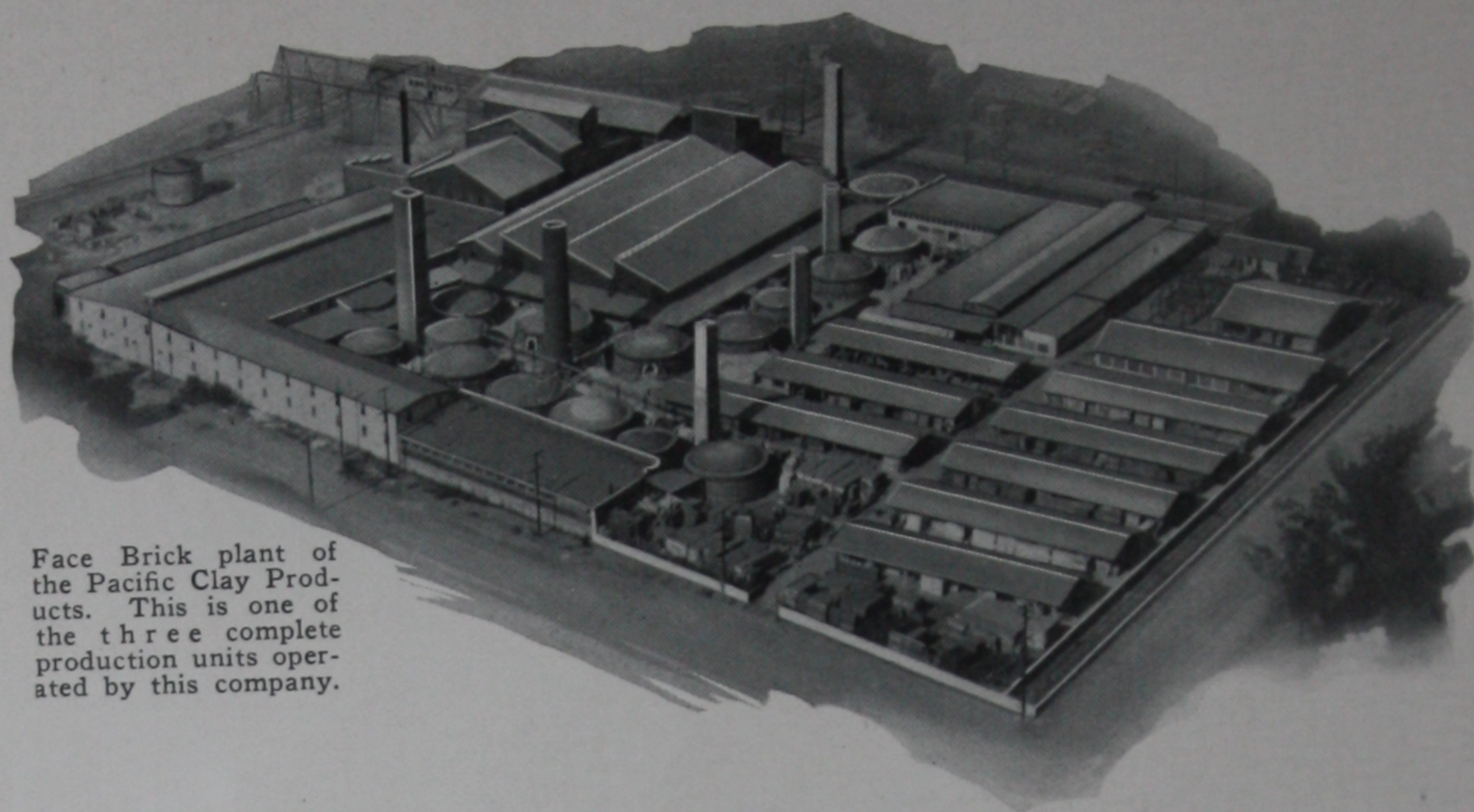
SUITE 650 CHAMBER  
OF COMMERCE BLDG.

1151 SO. BROADWAY  
LOS ANGELES

PACIFIC Face Brick ☐ Ornamental Brick ☐ Roof Tile ☐ Fire Brick ☐ Fire Clay ☐ Flue Lining ☐ Sewer Pipe ☐ Drain Tile ☐

ID 88-B 4134 TEL





Face Brick plant of the Pacific Clay Products. This is one of the three complete production units operated by this company.

## Color in California Architecture

*California Architects Develop a Distinct Leadership in the Use of Face Brick*

**A** NEW NOTE has been struck in American architecture, the outstanding feature of which is color. Everywhere in homes, business blocks and public buildings the old-fashioned sombreness and solidity of tone is relieved by splashes and dashes of brilliant color. Striking effects are accomplished without violating the tenets of good taste. Structures take on an aspect of life and cheerfulness which was absolutely impossible during the reign of severity of a few decades ago. True architectural beauty has come into its own.

California architects are conspicuous leaders in this new freedom of design. Hundreds of schools, churches, homes, public buildings and skyscrapers up and down the Pacific Coast stand as imposing monuments to California's architectural originality. Distinct new types of buildings have been created—veritable triumphs for their designers and pacemakers for the world.

This lack of restraint notably characterizing the California architect's creative work during the last few years has inspired manufacturers of clay products to new and broader efforts. Especially is this true in face brick. For with face brick alone can the architect get permanent color effects—

everlasting results which increase in beauty and charm as the years roll by.

Pacific Clay Products has been working hand in hand with the architects of California in developing face brick which breathe the colorful spirit of this sunny state. In this catalog an effort has been made to present the complete story of Pacific Clay Face Brick—not only the phys-



View showing a particularly heavy vein of high grade clay at one of the five mines owned and operated by Pacific Clay Products.



# PACIFIC CLAY PRODUCTS



Clay receiving yard and bins, where raw material from the various Pacific Clay mines is classified, graded and stored.

ical facts which the architect must have in his daily work, but enough of the human side of making brick and building with brick to give him, perhaps, new ideas and new inspiration.

## *The Genesis of Pacific Brick*

To obtain the strength, plastic bond, color and working properties required by Pacific Clay Products, it is necessary to use clays from many different localities. Five mines, located in Riverside and San Diego Counties owned outright by Pacific Clay Products, are worked by men of long experience and skill in supplying the plants with raw materials of the proper grade. A corps of prospectors is in the field continually looking for new deposits of a suitable standard, and strict laboratory tests insure uniformity as well as quality; all of which is tremendously important to the architect, especially where an addition is being built requiring exact duplication of the original brick. Raw clay for Pacific Clay Face Brick is shipped by train to its Los Angeles plant on West Avenue 26 where modern unloading equipment deposits it in its particular bin.

## *Color Natural, not Artificial--- Accomplished by Scientific Mixing*

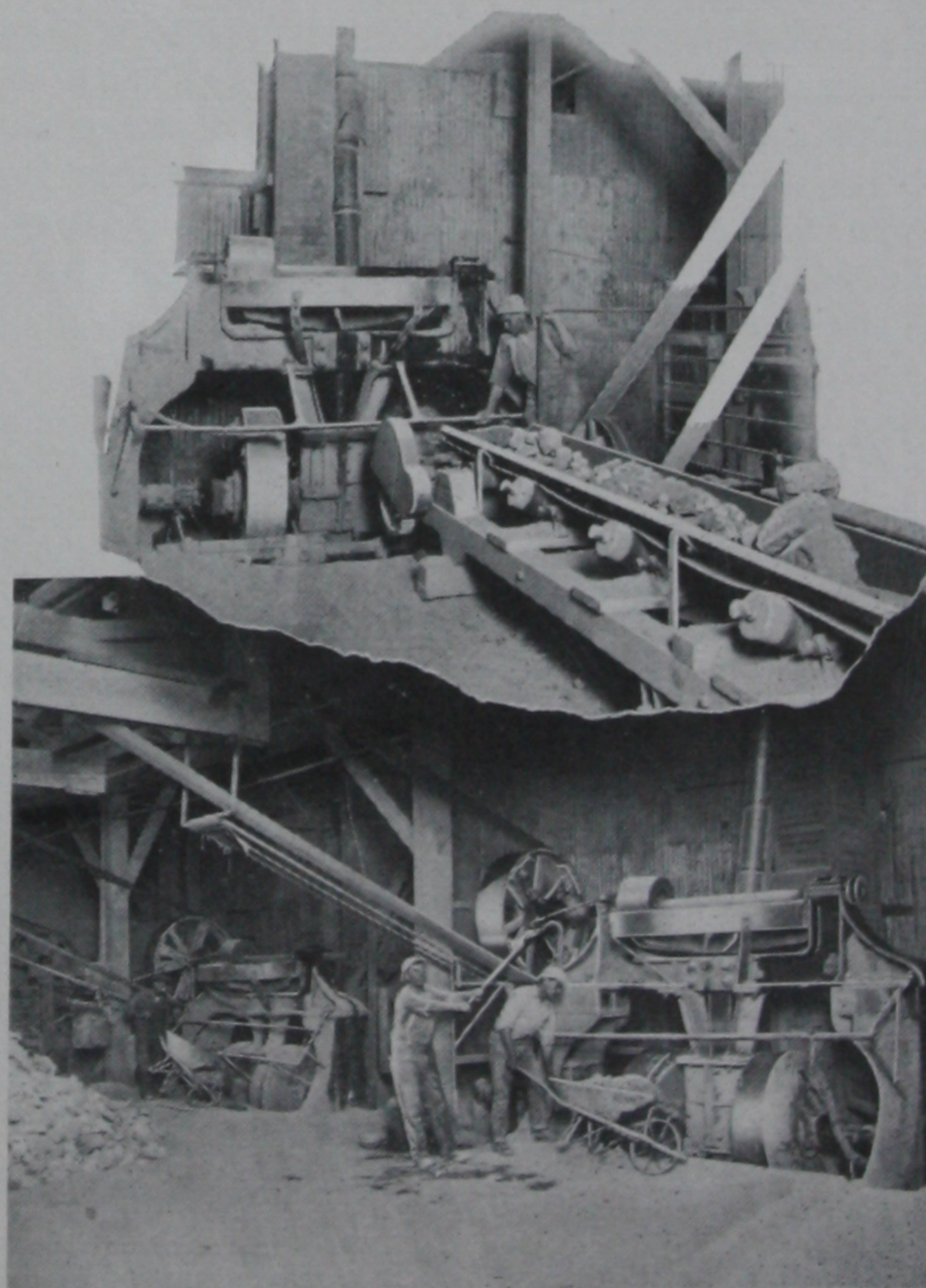
Proper mixing is accomplished by releasing the clay from these bins in proportions conforming with the formula of the particular Face Brick to be manufactured.

All of the wonderful color effects to be found in Pacific Clay Face Brick are achieved by this scientific mixing. No artificial coloring matter is used. Only long experience and intimate knowledge of the

properties inherent to California clays assure this accomplishment. But the result is of first importance to the architect, contractor and builder. They are certain of permanent colors, which merely mellow into enhanced beauty.

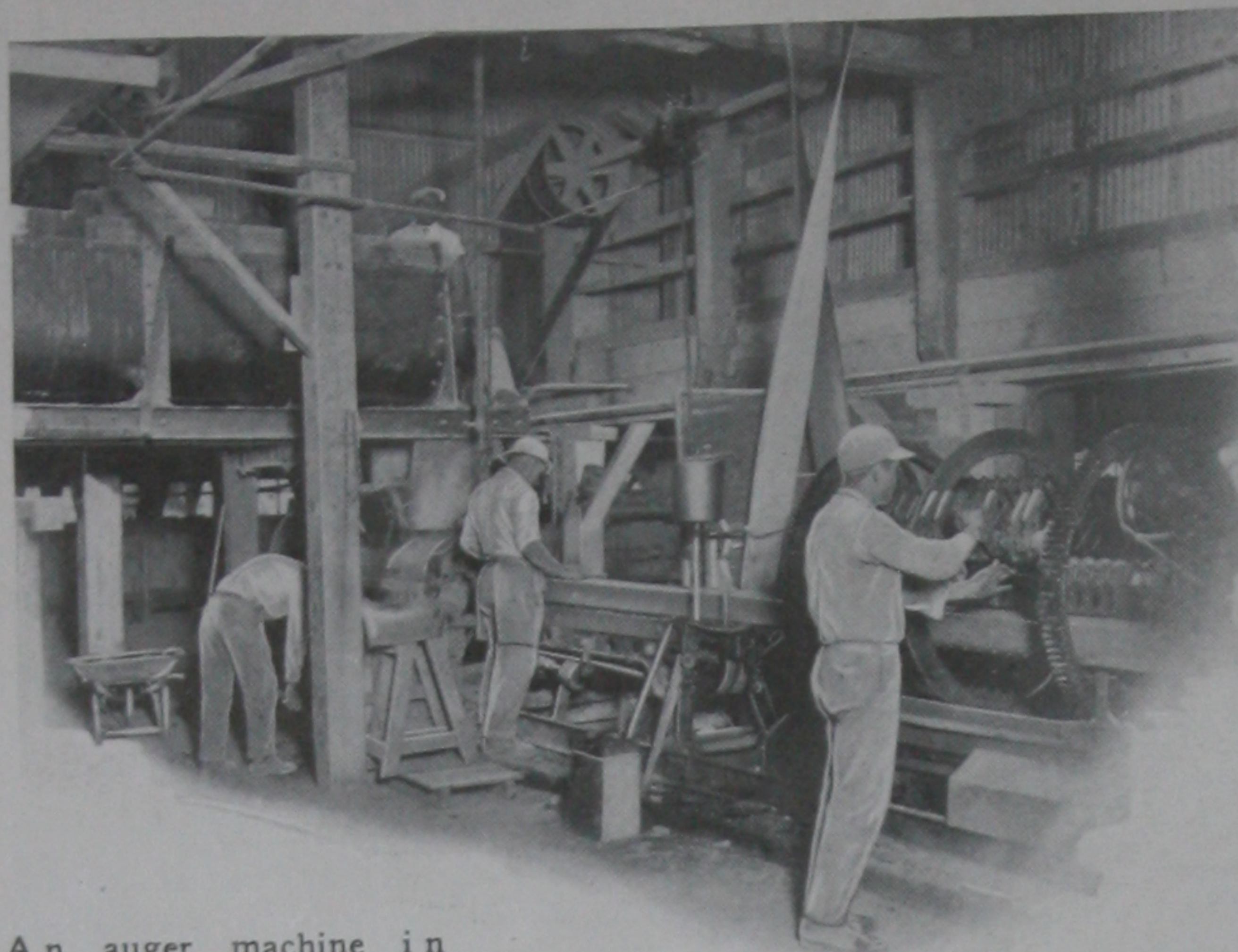
## *Careful Grinding Insures Uniform Texture*

A conveyor of special design carries the various clays in proper proportions to the grinding machines or dry pans where they



Upper picture shows mixing conveyor, by which the different clays are carried in correct proportion to the grinding and mixing mill, shown below.





An auger machine in one of the plants, where Pacific Clay Products face brick are made with exacting uniformity.

are combined and ground to the requisite fineness. Next the material is put through vibrating sizing screens of the latest type so that all coarse particles are eliminated. The screened clay is carried to storage bins to sweat, or weather. During this sweating period, the moisture in the clay permeates the mass thoroughly, giving it uniform plasticity. The grinding is supervised with utmost care, since it is imperative that the clay be sufficiently and uniformly fine before being molded into "Pacific Quality" Face Brick. Careful grinding insures uniform texture.

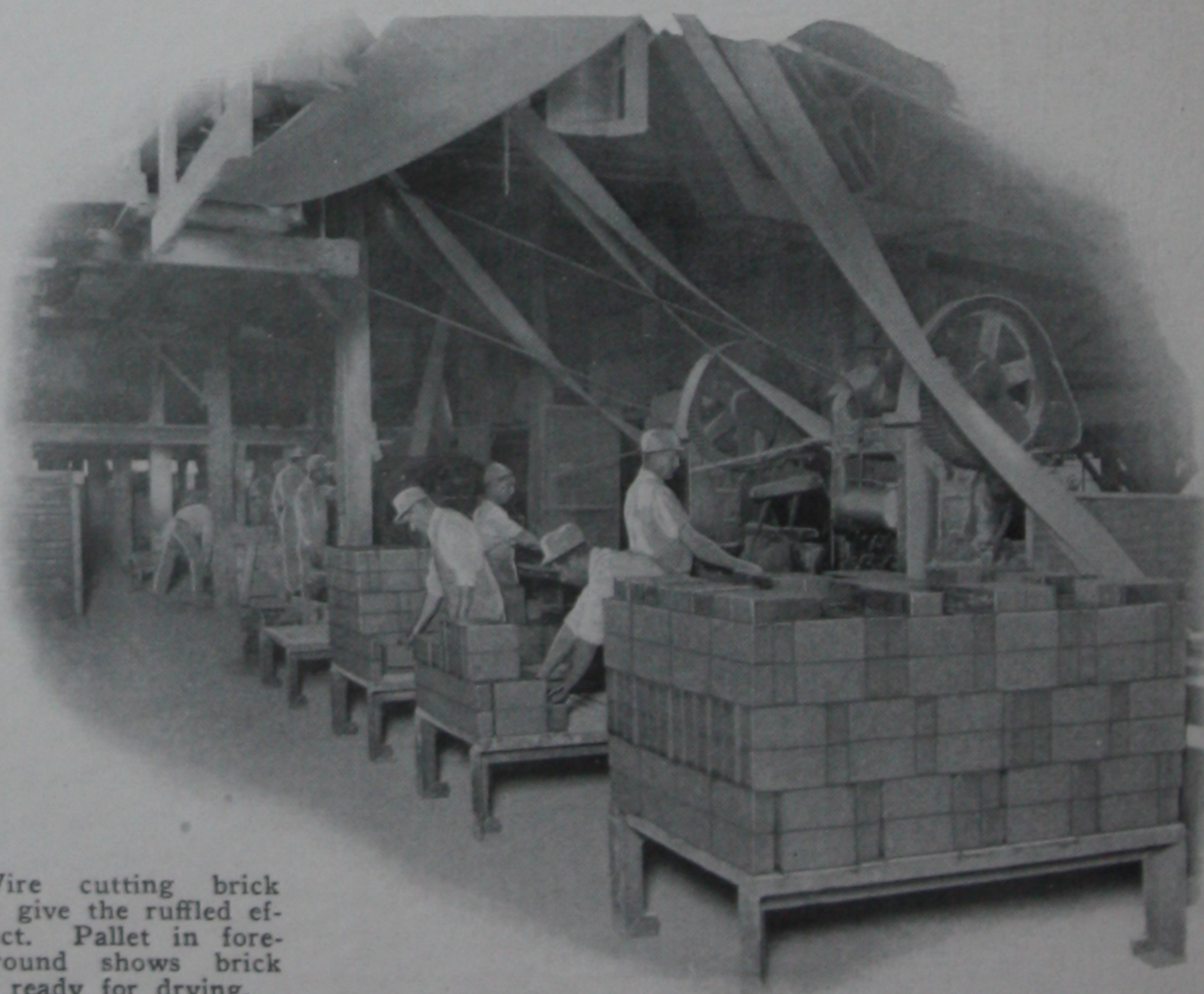
### *The Wire - Cut or Stiff Mud Process used for Ruffled Brick*

From the storage bins, a traveling conveyor with a disc feeder carries the clay to a pug mill—a long elliptical trough in which revolves a heavy shaft studded with knives, set at a slight angle. Here a measured amount of water is added and the revolving blades mix and knead the material into a thoroughly plastic mass. From the pug mill, the

clay passes into an auger machine, which works on the principle of a meat grinder. From this, the material is forced out through a die in a rectangular ribbon, the exact size of green brick. The top surface of the stream is "ruffled" by a mechanical device, and passes to the cutting table where an automatic cutter makes fourteen brick in one operation. The capacity of one machine is 40,000 brick per day.

### *20 Tons Pressure on a Single Dry Pressed Brick*

Imagine sticking your finger into a Pacific Clay dry press—the pressure is 20 tons, or 40,000 pounds. This tremendous force is required to squeeze the air out of the clay mixture and to increase the density of the mass so that the finished burned brick is hard, homogeneous and up to the standard of the "Pacific" trademark. Mixing of the clay for the dry presses is done by the same type of disc feeders used in making ruffle brick; but no water is added in this process, the requisite quantity having been added at the dry pans. The exact amount of clay needed for a brick is automatically dropped into the mould, and presto!—down comes the twenty-ton plunger and out comes the brick.



Wire cutting brick to give the ruffled effect. Pallet in foreground shows brick ready for drying.





## A Shade of Old Rose Ruffle Brick

With the wide range of blended color tones available in varied old rose shadings the architect is enabled to conceive walls of rare beauty. The face is slightly ruffled—just enough to give the soft, velvety appearance to a wall so much in vogue at the present time; yet not enough to catch dust and give the building a dirty appearance. Few brick give the architect such opportunity for original and striking design.

### SIZES

$2\frac{3}{8} \times 4\frac{1}{8} \times 8\frac{3}{8}$ " Standard Size Face Brick.

$2\frac{3}{8} \times 4\frac{1}{8} \times 12$ " Roman Brick (Standard thickness; Roman length).

$2\frac{3}{4} \times 4 \times 10$ " 10" Ruffle Brick.

Approximate weight of Standard Size Brick,  
5½ pounds.

### COLORS and KEY NUMBERS

150	Tan	Ruffle Brick, light, medium or dark.
155	Golden	Ruffle Brick, light, medium or dark.
160	Grey	Ruffle Brick, light, medium or dark.
165	Cream	Ruffle Brick.
170	Old Rose Ruffle Brick.	Mingled shades.

**Prices on Request**

Model Specification on page 20 of this Catalog

*A Popular Brick in nine different shades, running from the pale buffs to the deep reds*



Medico-Dental Building, Los Angeles, enhanced in beauty by Pacific Clay Products face brick  
Walker & Eisen, Architects

PACIFIC Face Brick ☐ Ornamental Brick ☐ Roof Tile ☐ Fire Brick ☐ Fire Clay ☐ Flue Lining ☐ Sewer Pipe ☐ Drain Tile ☐



## *A Pint and a Half of Water Still in this Brick*

A ruffle brick contains approximately one and one-half pints of water, most of which must be driven off before the brick is burned. Pacific Clay Products employs an unusually efficient humidity drier which speeds up the work, and at the same time materially enhances the quality. As the brick come from the cutter they are placed upon pallets holding 500 each and conveyed by electric hoist trucks to the dryer. When the dryer is filled, warm air is circulated and soon becomes saturated with the moisture evaporated from the brick. The temperature is then raised by passing the circulating air over steam coils, until the brick

are heated clear through sufficiently to drive off practically all the moisture they contain. Next vents in the dryer are opened, the moisture-laden air allowed to escape, and the brick to become thoroughly dry. This method insures a denser, better product than is possible under the old-fashioned air-drying system. During the forty-eight-hour period required for drying, over thirty tons of water is drawn off from a dryer containing 40,000 brick.

## *How Quality is Burned into Pacific Face Brick*

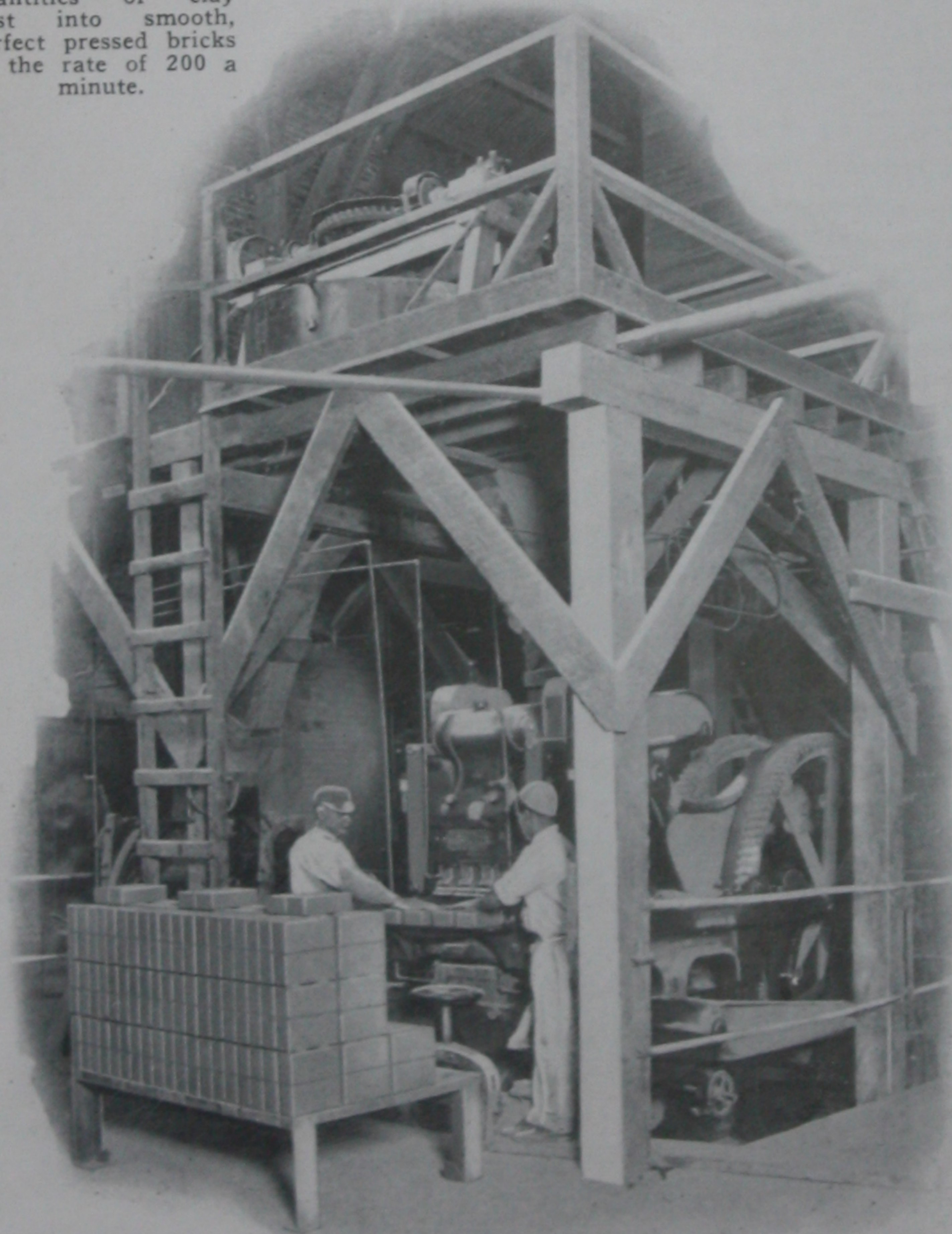
It takes nearly three weeks to burn a brick! A kiln holds about 60,000 brick, and enough gas is consumed during the burning period to heat your house for 30 years. Here is how it's done:

Each of the 16 Pacific Clay kilns at the Twenty-sixth Avenue plant is a beehive structure about 30 feet in diameter and 15 feet high. Brick are carefully placed in tiers, with plenty of space for the proper amount of draft to insure uniform burning. Skill that comes only with experience is required in this work.

Approximately three days are consumed in the setting of each of these brick kilns, after which the fires are started in ten different fire boxes. The heat from these fire boxes is applied slowly at first until the water smoking period is completely passed, when the heat is increased more rapidly until a temperature of approximately 2300 deg. F. is attained. This burning continues from eight to ten days, depending on the kind of brick which are being burned. Then at least a week is required for the brick to cool, and 2 or 3 days are required to "draw" the kiln. But how do we know when a brick is properly burned?

(Continued on Page 8)

Dry Press which transforms scientifically proportioned quantities of clay dust into smooth, perfect pressed bricks at the rate of 200 a minute.







## Wire Cut Golden Ruffle Brick

The object in the development of this brick was to bring out a product denser and better adapted to building purposes than the old dry pressed line.

This was accomplished by a different method of manufacture, which produces a hard vitreous brick, slightly ruffled on the face and ends, and gaining thereby light and shadow effects which lend to the building a soft, velvety appearance.

With this brick a certain variation in color is permissible, which greatly enhances the beauty of the building. This is impossible with the solid, flat color tones of the dry press brick.

With wire cut, ruffle brick, buildings retain their new appearance for a much longer time.

### SIZES

- $2\frac{3}{8} \times 4\frac{1}{8} \times 8\frac{3}{8}$ " Standard Size Face Brick.  
 $2\frac{3}{8} \times 4\frac{1}{8} \times 12$ " Roman Brick.  
 (Standard thickness; Roman length).  
 $2\frac{3}{4} \times 4 \times 10$ " Ruffle Brick.

Approximate Weight of Standard Size Brick,  $5\frac{1}{2}$  pounds.

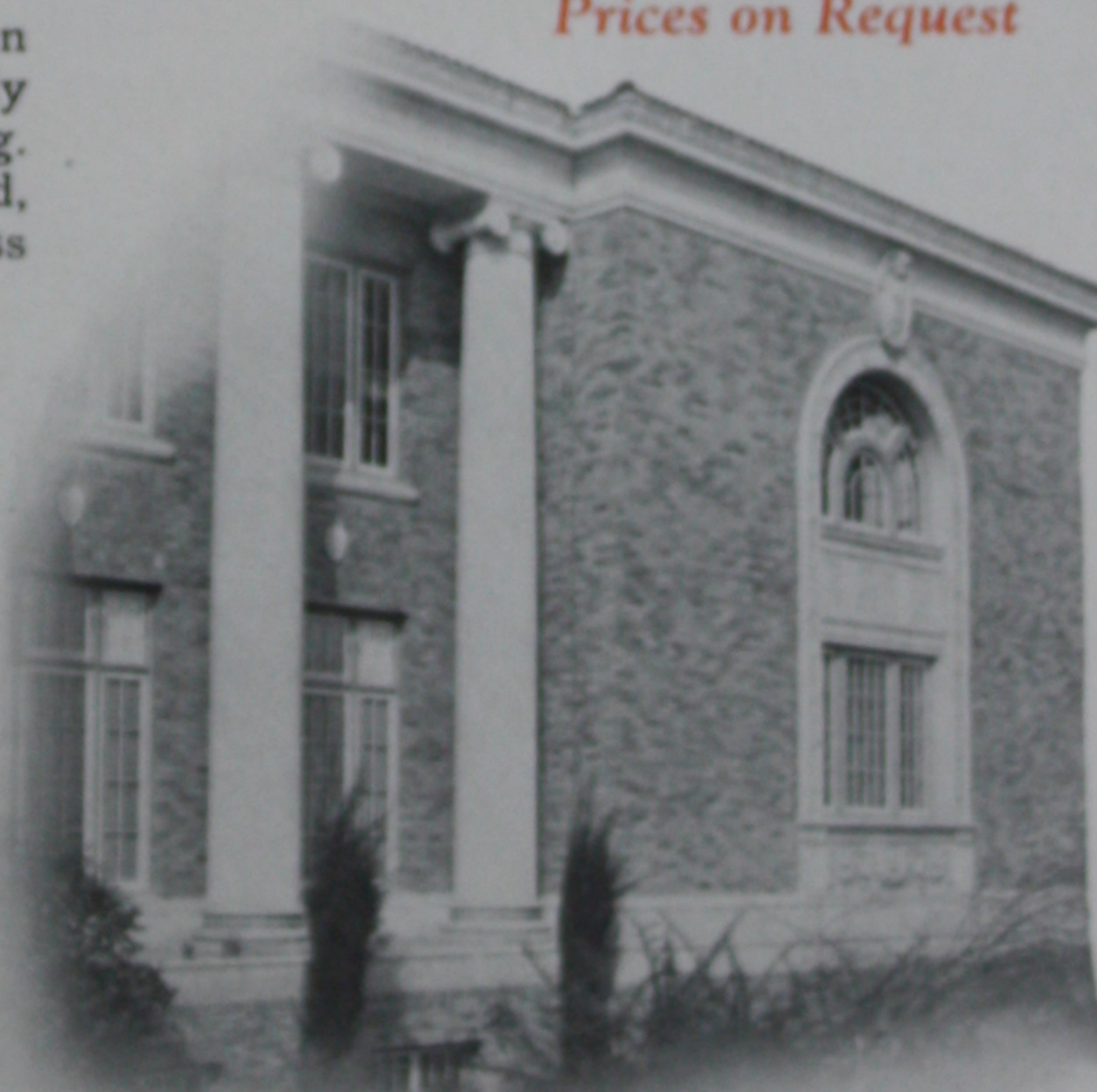
Brick detail, showing effective combination of selected Golden and Gray Ruffles used in Fresno High School. Coates & Traver, Architects

### COLORS and KEY NUMBERS

40	Cream	Plastic Clay Brick.
42	Buff	Plastic Clay Brick, light or dark.
44	Brown	Plastic Clay Brick.
45	Grey	Plastic Clay Brick.
48	Old Gold	Plastic Clay Brick, light, medium or dark.

Model Specification on page 20 of this Catalog

*Prices on Request*





One of the electric trucks for intra-plant transportation.



### *Burning in Pacific Kilns Double Checked Day and Night*

Workmen, thoroughly trained in Pacific Clay methods, watch the kilns night and day. During the "burn," small tunnels are left at top and bottom of the kiln doors and in these are placed pyrometric cones visible to the burner from the outside. Four cones are placed at each location and each has a different melting point. As they melt and tip over, the burner knows what heat pre-

A glimpse of one corner of the immense drying area where Pacific Clay brick are prepared for burning.



vails and regulates his fires accordingly. When the last cone has fallen, he knows his brick are properly burned.

Another check on this process is made, however, by the pyrometer system, under which the heat in the interior of each kiln is automatically recorded in the superintendent's office so that he can ascertain at a moment's notice the exact heat condition in any given kiln.

Brick shrink 8% to 10% in burning. But in 35 years' experience in brick burning, Pacific Clay has developed processes which have made its products famous not only for uniformity in color but for uniformity in size.

### *Enamel Brick Typify Pacific Standard of Quality*

Few manufacturers in the United States offer the equal in quality to Pacific Enamelled Brick; and upon the Pacific Coast, "Pacific" Enamels are the recognized standard of quality. This excellence is due: First, to the exceptional white color and dense texture of the brick body used for

(Continued on Page 10)





## Dry Press Brick

Pacific makes a complete line of cream, buff and old gold Dry Press Brick. The buff comes in 2 shades: light and red; and the old gold in 3 shades: light, medium and dark.

For those who desire the older type of architecture with close jointing effects, we recommend this brick. Nothing can take its place for interior decoration where mantels, chimney breasts, wainscoting, etc., require plain faces.

### SIZES

$2\frac{3}{8} \times 4\frac{1}{8} \times 8\frac{3}{8}$ " Standard Size Face Brick.

$2\frac{3}{8} \times 4\frac{1}{8} \times 12$ " Roman Brick (Standard thickness; Roman length).

Approximate Weight of Standard Size Brick,  $5\frac{1}{2}$  pounds.

### COLORS and KEY NUMBERS

200	Buff	Pressed Brick, light or medium.
201	Red Buff	Pressed Brick.
205	Cream	Pressed Brick.
212	Grey	Pressed Brick.
215	Bronze	Pressed Brick.
219	Old Gold	Pressed Brick, light, medium, or dark.

**Prices on Request**

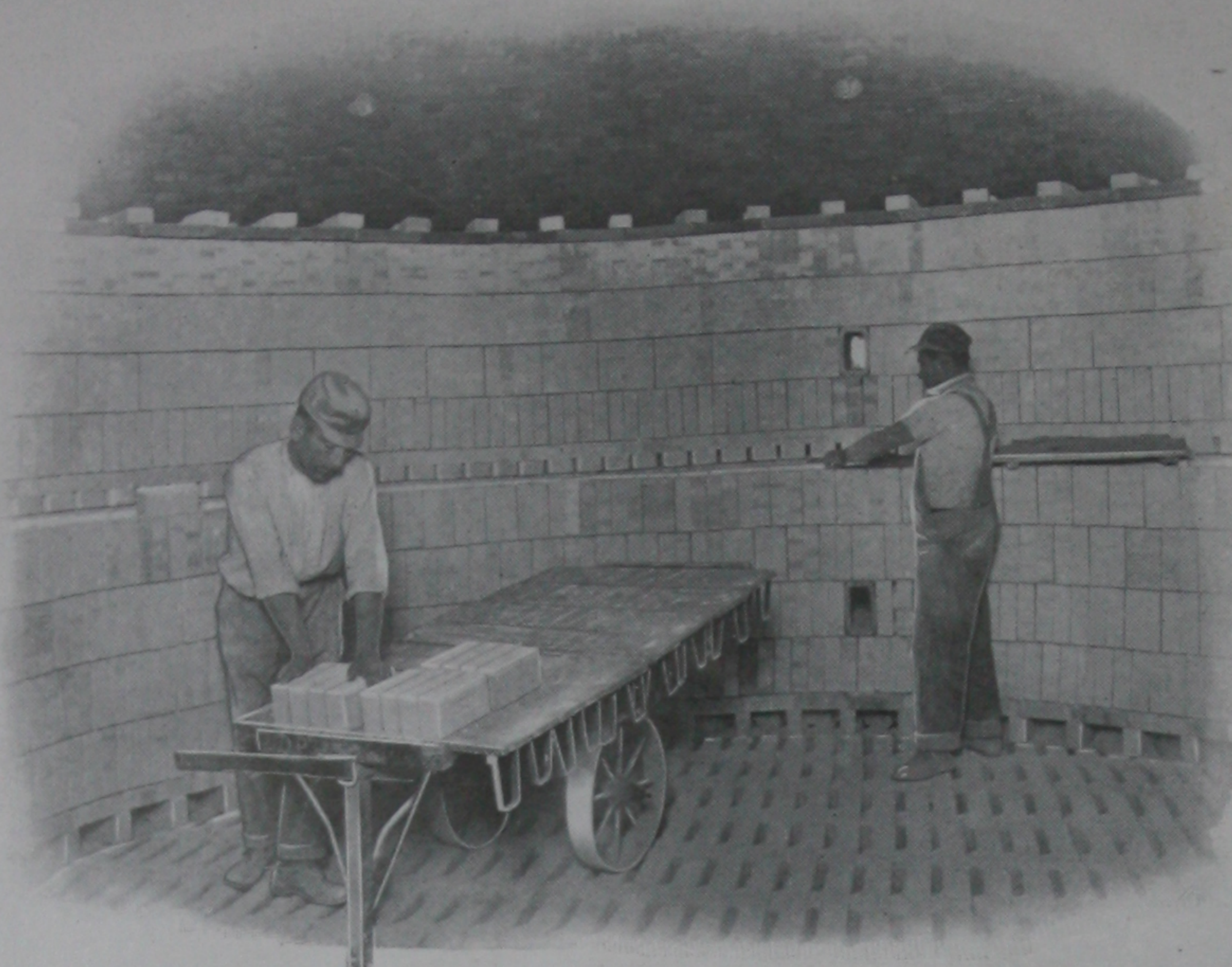
Model Specification on page 20 of this Catalog



Pacific pressed brick was selected to beautify the Hayward Hotel Annex, pictured above.  
John and Donald Parkinson, Architects

PACIFIC Face Brick ☐ Ornamental Brick ☐ Roof Tile ☐ Fire Brick ☐ Fire Clay ☐ Flue Lining ☐ Sewer Pipe ☐ Drain Tile ☐





Moulded and dried, Pacific Clay brick is "set" in the kilns to burn . . . 60,000 at a time in each of the kilns.

## *Safeguarding Pacific Quality*

Pacific Clay Products is jealous of the good will gained through its 35 years of service to architects and builders of Southern California and for this reason every possible effort is made to maintain the standard of quality of all products bearing the Pacific Clay trade-

mark. Daily laboratory tests are made of clays—in the raw, after grinding, after mixing, after pressing, after burning, Pacific sells only one quality and that is the best!

enameling; and, second, to special processes of manufacture—the perfected result of many years of experience in developing the Pacific high-heat glaze. All Pacific Enamelled Brick are double-burned. The highest quality dry pressed brick with the straightest and truest edges are carefully selected after the first burn, and go direct to the glazing room; there they are given three applications of Pacific glaze—a brush coat to fill up the pores of the brick, a slip coat and a gloss coat. Each brick is hand dipped.

As each burning is completed, and the kilns cool, the brick are carefully sorted according to shadings and texture, and then transferred to the stock sheds to await

The glazing material is carefully prepared by special Pacific process from Cornwall stone, flint, spar, ball clays and tin. No lead or zinc is allowed in the glazing mix.

(Continued on Page 12)

The brick are then re-burned, much as before, except that temperatures of 2700 degrees prevail and the brick are so arranged that the glazed surface is fully subjected to heat. A second 3 weeks' period is required to burn the glaze on Pacific Enamelled Brick. Every brick is carefully inspected for color and size before it is taken to the stock sheds for delivery.

Laboratory experts constantly watch the quality of Pacific Clay Products' raw materials.







## Enameled Brick

Architects and builders generally concede the superiority of "Pacific" Enameled Brick made from light-burning clays, double-burned, glazed with three coats of a special mix. They are repeatedly inspected to eliminate all but true shapes with clean cut edges.

The burning of enamel brick is a difficult and painstaking process and it is only by the exercise of meticulous care in every operation that highest results are obtained.

Pacific Clay has developed enamel brick-making to a fine science. Knowledge born of more than 35 years' experience goes into every brick. For trueness of size and shape, in beauty of color and for brilliance and permanence of gloss, Pacific Enameled Brick probably are not excelled by any brick in the world.

The J. W. Robinson store in Los Angeles is faced with Pacific Clay Enameled Brick, presenting a beautiful and distinctive exterior. Dodd & Richards, Architects.

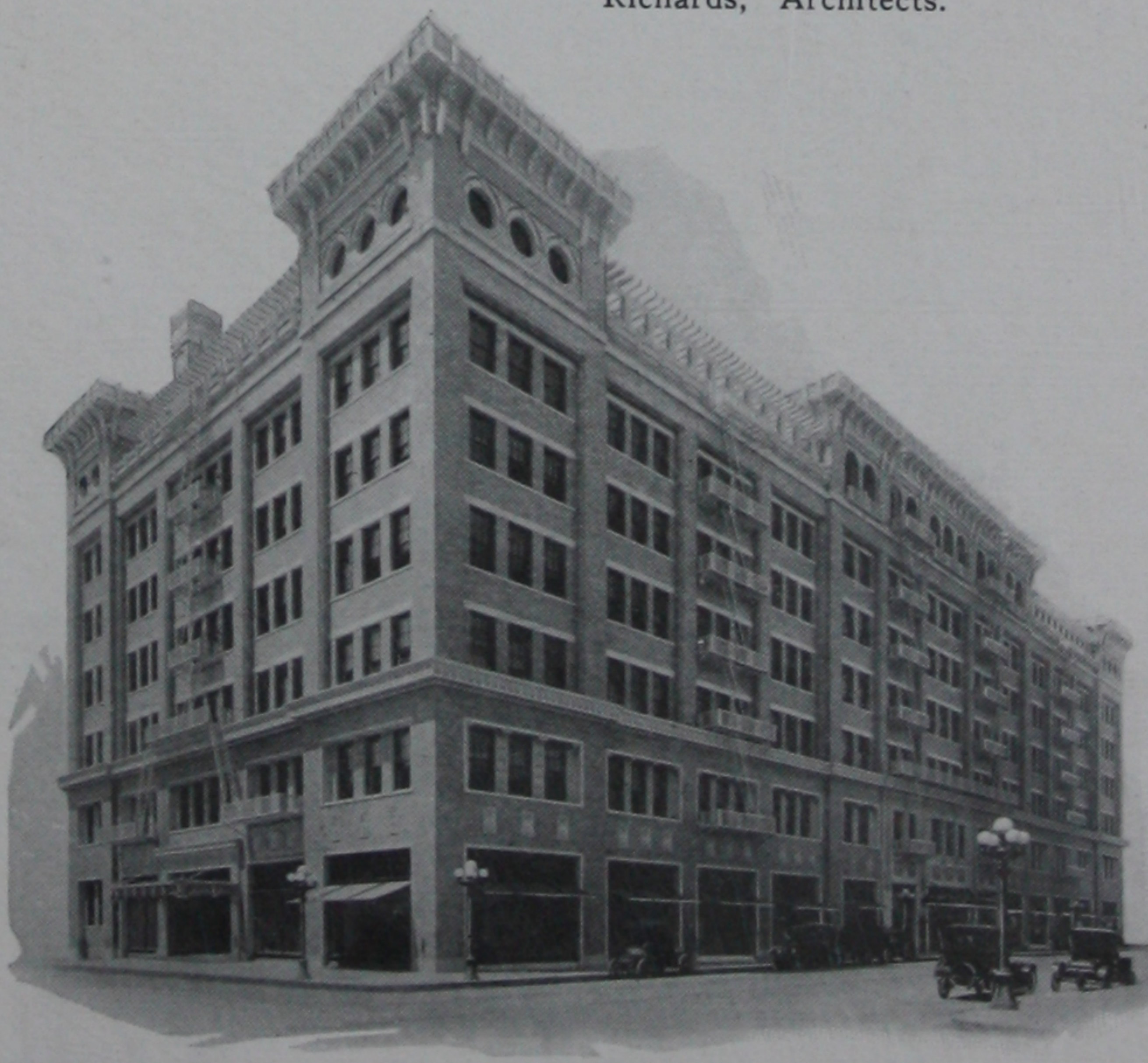
### SIZES

$2\frac{3}{8} \times 4\frac{1}{8} \times 8\frac{3}{8}$ " Standard Size Face Brick.  
 $2\frac{3}{8} \times 4\frac{1}{8} \times 12$ " Roman Brick (Standard thickness; Roman length).  
 $2\frac{3}{4} \times 4 \times 10$ " 10" Ruffle Brick.  
 Approximate Weight of Standard Size Brick,  $5\frac{1}{2}$  lbs.

### COLORS and KEY NUMBERS

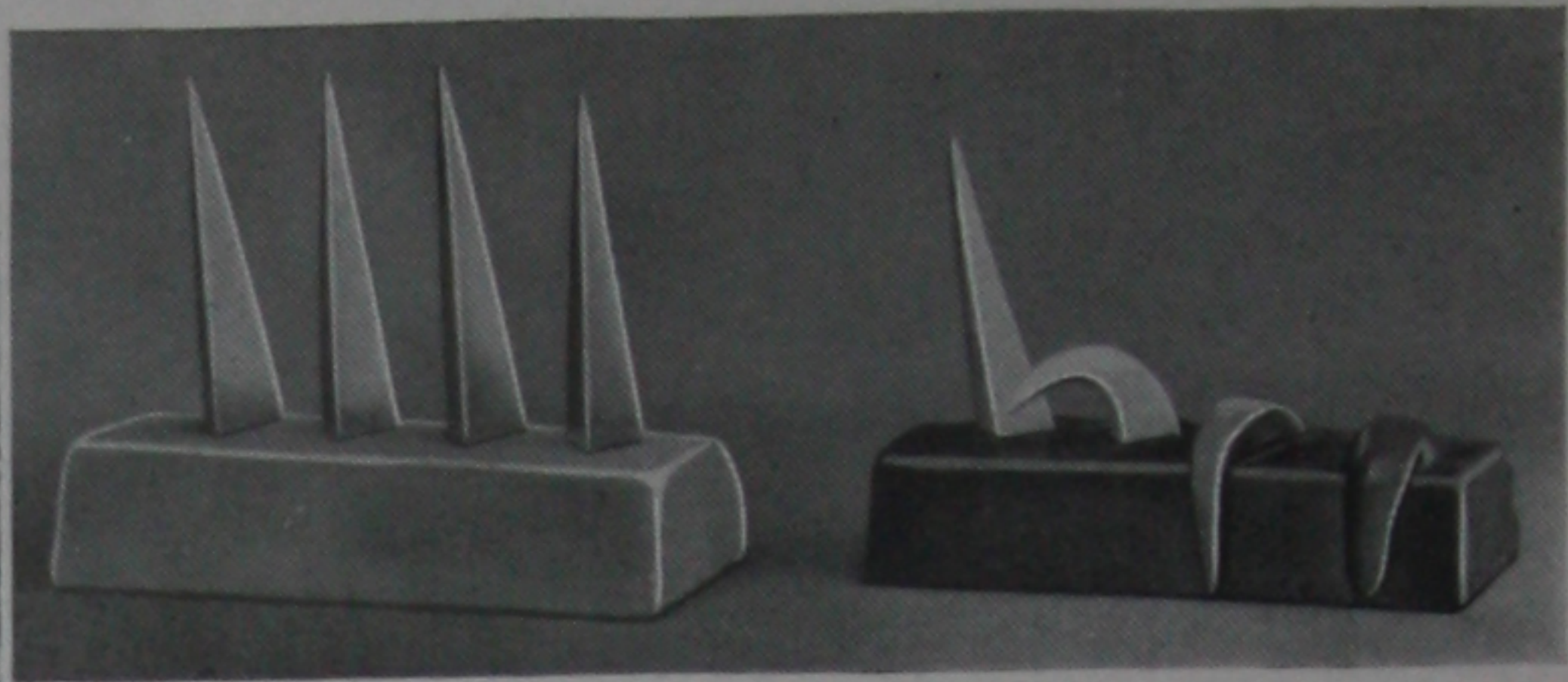
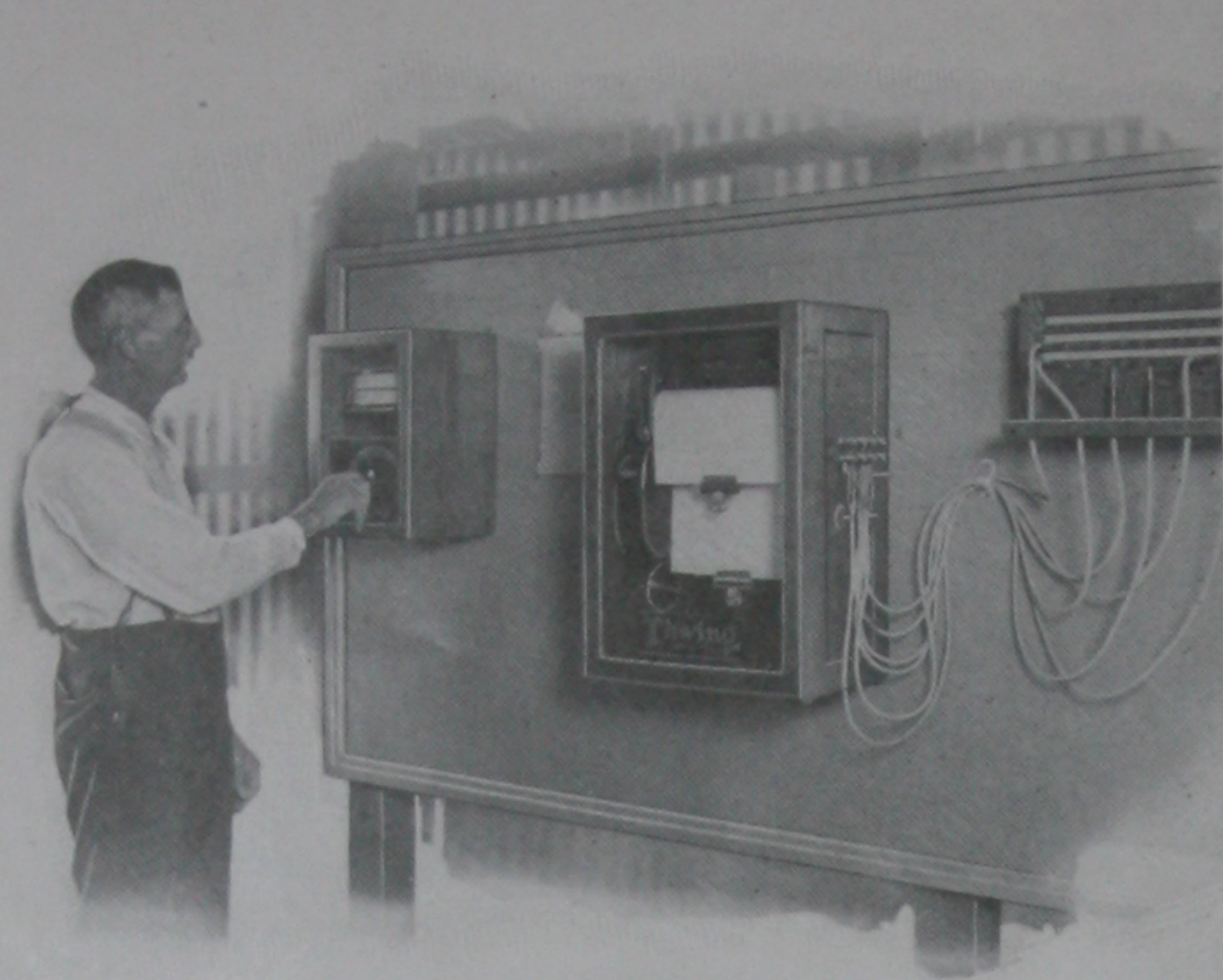
300	White	Enameled	Brick
308	Orchid	Enameled	Brick
310	Ivory	Enameled	Brick
319	Granite	Enameled	Brick
320	Green	Enameled	Brick
321	Green	Enameled	Ruffle Brick

PRICES ON REQUEST  
 Model specifications on page 20.





# PACIFIC CLAY PRODUCTS



Exact temperatures of kilns while burning are double checked by the electric recording pyrometer (at the left) and the pyrometric cones shown above. These cones, placed in the kiln near a peep-hole, succumb to varying degrees of heat, allowing the superintendent accurately to gauge and regulate the burning process.

delivery. At the face brick plant of Pacific Clay Products several acres of these stock sheds are traversed by loading streets, to expedite handling. Electric yard-trucks scurry about, filling odd lot orders with a minimum of delay. At the end of each street is a car-loading platform, making out-of-town shipments simple and speedy of ac-

complishment. This efficient arrangement is characteristic of Pacific Clay Products thoroughness in serving the building fraternity. For service, next to quality, is the prime element in carrying out a contract.

Just one of the many "streets" of Pacific Clay Products brick awaiting delivery by truck or rail.







## Mantel and Hearth Tile

Pacific offers a complete line of mantel and hearth tile in all the wanted colors. It is possible for the architect to originate many distinctive effects by proper blending of the various shades in the Pacific line.

A lately developed tendency emphasizes this tile as an insert for decorative purposes in small one-story buildings. Some very beautiful harmonies have been created.

### SIZES

3x6x1 inch thick  
6x6x1 inch thick

### COLORS

Cream                      Buff  
Brown                      Old Gold  
Gray

## Mortar Color

In building with face brick, it is essential to use a mortar harmonizing in color. Many architectural effects otherwise beautiful, are ruined by unfortunate choice of mortar color.

Pacific Clay Products maintains a complete line of mortar color, guaranteed against fading. The cardinal colors are:

Red                                      Brown  
Buff                                      Chocolate  
Black

Any shade or color desired may be secured by mixing these colors. Pacific's Mortar Color is shipped in 100-lb. bags. Smaller quantities may be had, at a slight increase in price.

The beauty of the Christian Church, Hollywood is a tribute to the Pacific brick used in its construction.



Main Entrance  
Christian Church, Hollywood  
Robert H. Orr, Architect

PACIFIC Face Brick ☐ Ornamental Brick ☐ Roof Tile ☐ Fire Brick ☐ Fire Clay ☐ Flue Lining ☐ Sewer Pipe ☐ Drain Tile ☐



## A Roomful of Face Brick Ideas

Scores of designs and architectural effects easily accomplished with Face Brick are illustrated in a special exhibit room at the general offices of Pacific Clay Products in the Chamber of Commerce Building.

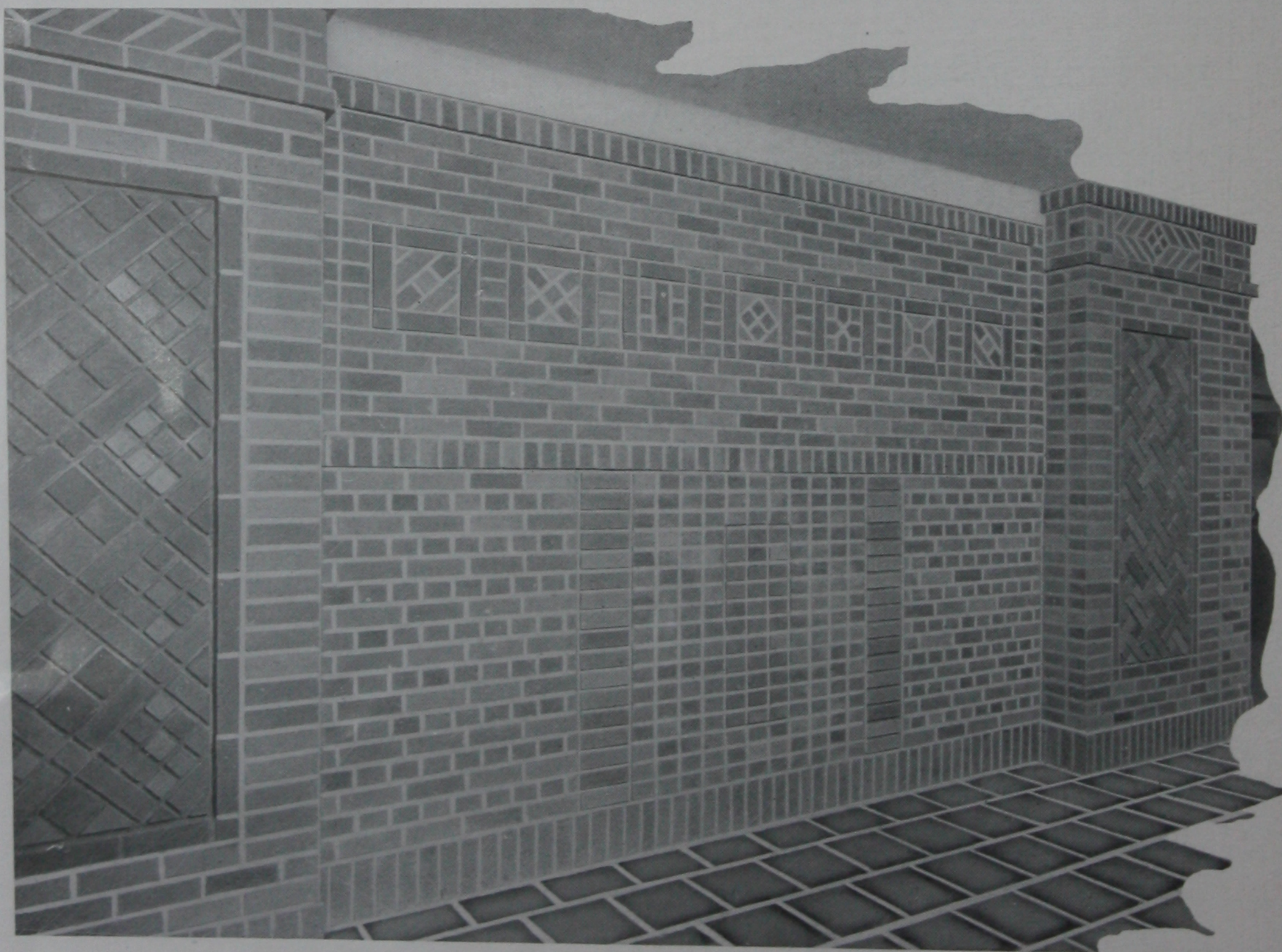
The four walls and floor present pleasingly diversified treatment with Face Brick and tile. Every square yard contains new and different designs. No two panels or patterns are alike, yet the whole is worked out with such studious regard for the rules of architectural design that a harmonious ensemble is presented.

Squares, parallelograms, diamonds, arches and other geometrical figures are worked out in kaleidoscopic variety. The room abounds in new and interesting suggestions for the architectural handling of facades, entrances, doorways, cornices, windows, mantels, etc. Every design is entirely practical and can be accomplished on the job by any brick mason.

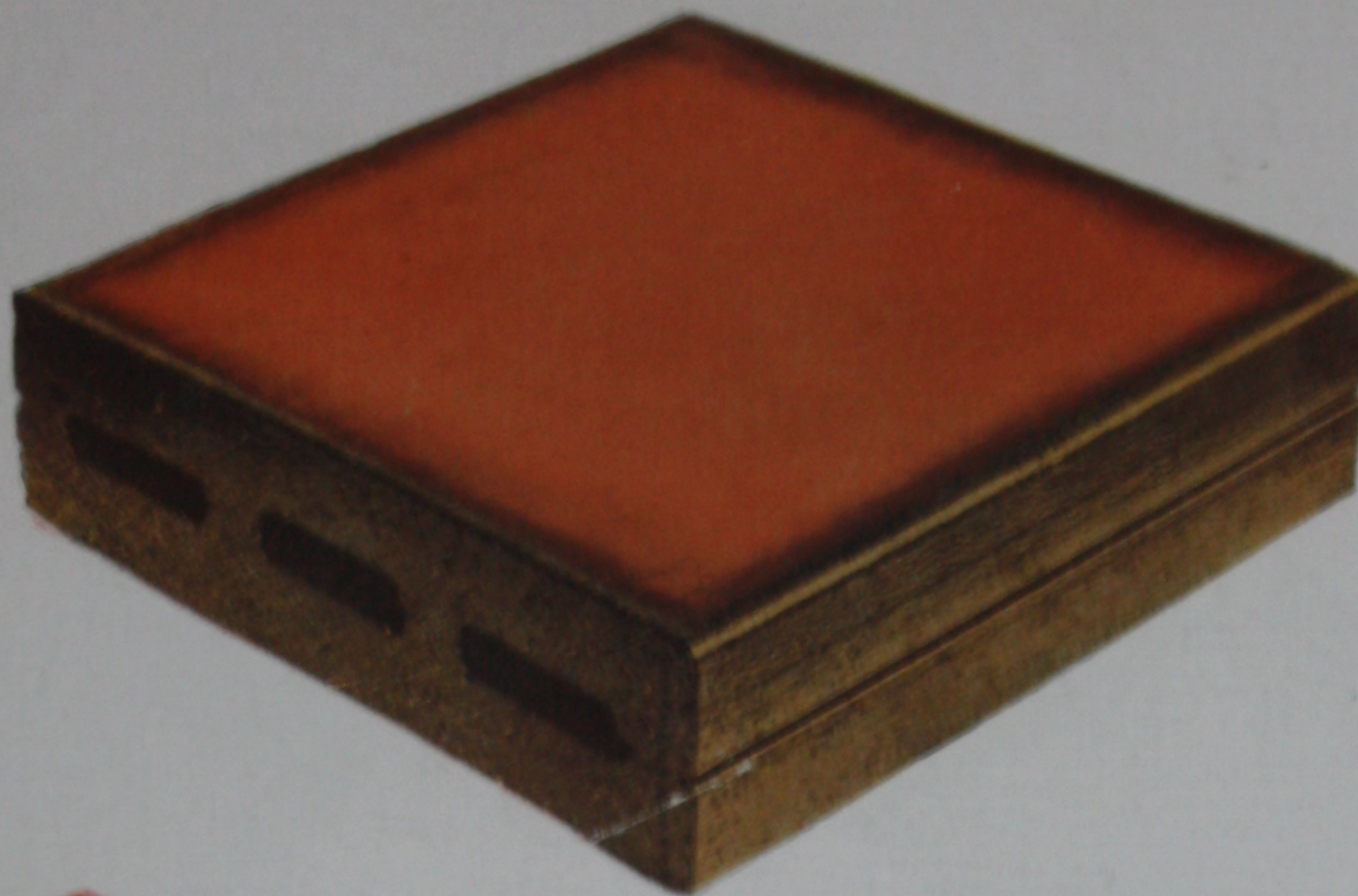
It is a room of many ideas—one which merits the most intensive study. Architects, contractors and builders are cordially urged to make full use of this exhibit, as of all other facilities of Pacific Clay Products.

### Free Advisory Service on Face Brick Construction

In this connection, it should be remembered that the counsel and suggestions of Pacific Clay's experts on face brick construction are always available. Men with years of experience in every phase of face brick building from designing to laying the brick will be glad to share their knowledge with you.







## Los Nietos Quarry Tile

Pacific Clay Products has developed the exceedingly artistic Los Nietos Quarry Tile, made from red burning clay. Process burning allows the border to take on a brownish black hue, blending beautifully into the brilliant red of the center when laid in patios, porches, dining room floors and wherever a deep, rich color is desired. Los Nietos Quarry Tile is molded and burned in pairs, as shown above, to insure uniform shape and size and avoid warping. The scored edge allows them easily to split for laying. The tile is of distinctive merit in the creation of uniquely artistic effects.

### COLOR, SIZE and WEIGHT

This special tile is made in one coloring and size.

Color: As shown above.

Size: 3x12x12 inches.

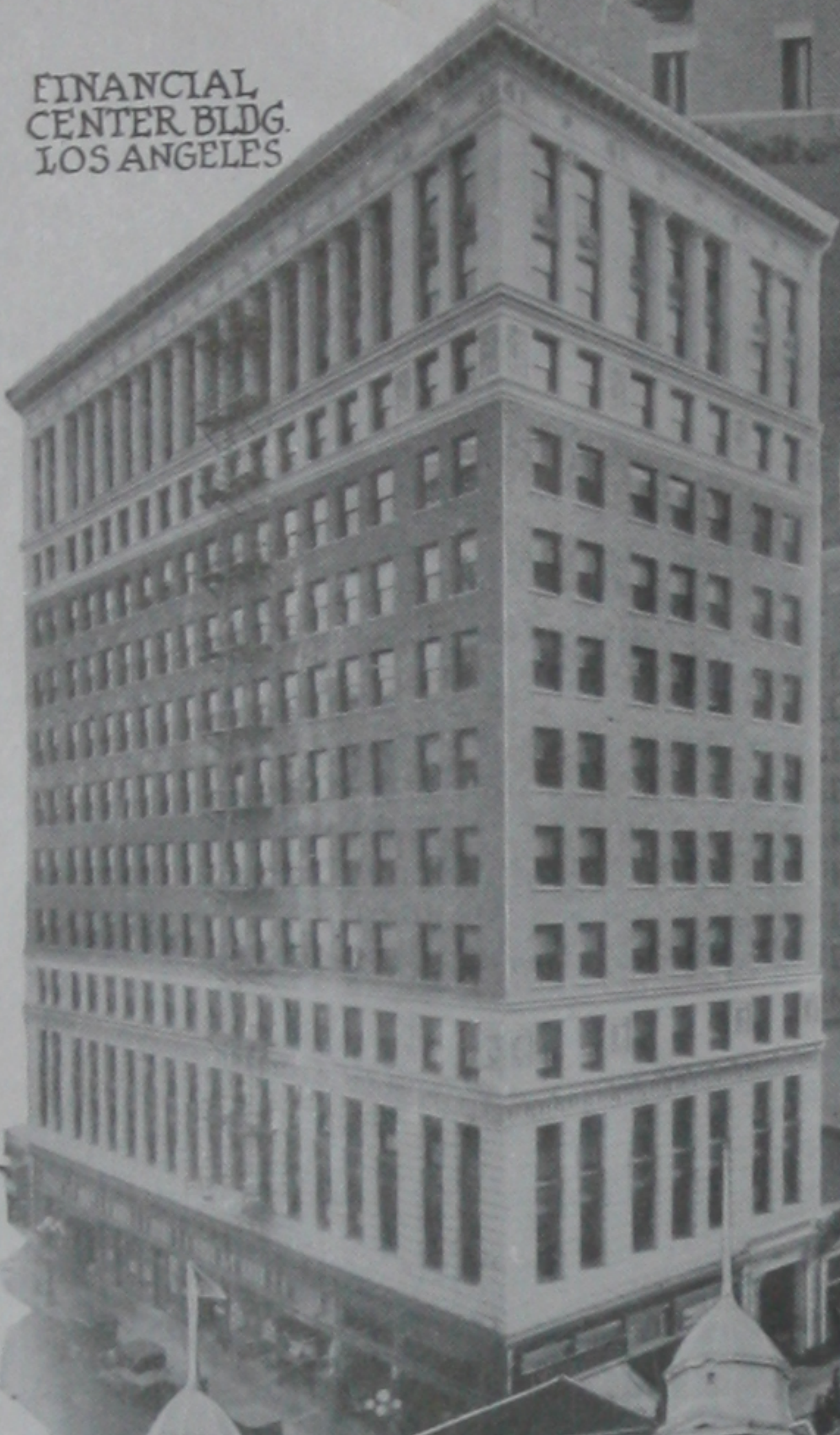
Weight: 15 lbs. per single tile.

PRICES ON  
REQUEST




Grill at Lakeside  
Golf Club, where Los  
Nietos Quarry Tile  
make a beautiful, dur-  
able and sound-dead-  
ening floor.






FINANCIAL  
CENTER BLDG.  
LOS ANGELES



HOME OF WM LACY  
LOS ANGELES




Three Pacific Clay Products  
Plants for the Man-  
ufacture of

FACE BRICK	FIRE BRICK
SEWER PIPE	FLUE LINING
DRAIN TILE	CONDUIT
STONEWARE	
— and other CLAY PRODUCTS	


~ ~ ~

RETAIL YARDS


West Pico Yard, 4848 W. Pico Street  
Slauson Yard, 56th and McKinley Av.  
Lincoln Heights Yard, 318 W. Ave. 23



TEXTILE CENTER BLDG  
LOS ANGELES



CITY HALL, LONG BEACH



MIRAMAR HOTEL, SANTA MONICA



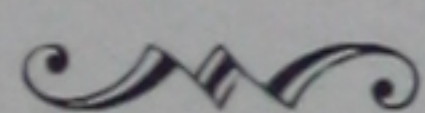


## ORNAMENTAL BRICK

**O**N the following two pages the architect will find many suggestions for the effective use of ornamental brick.

The various shapes and sizes illustrated herein are not carried in stock, but are made to order for each particular job.

All the standard size headers, stretchers and returns are available from Pacific's complete line.



### TYPES

Nos. 127, 135, 140 Stretchers

Nos. 127, 135, 140 Returns

Standard Size Stretchers

Standard Size Headers

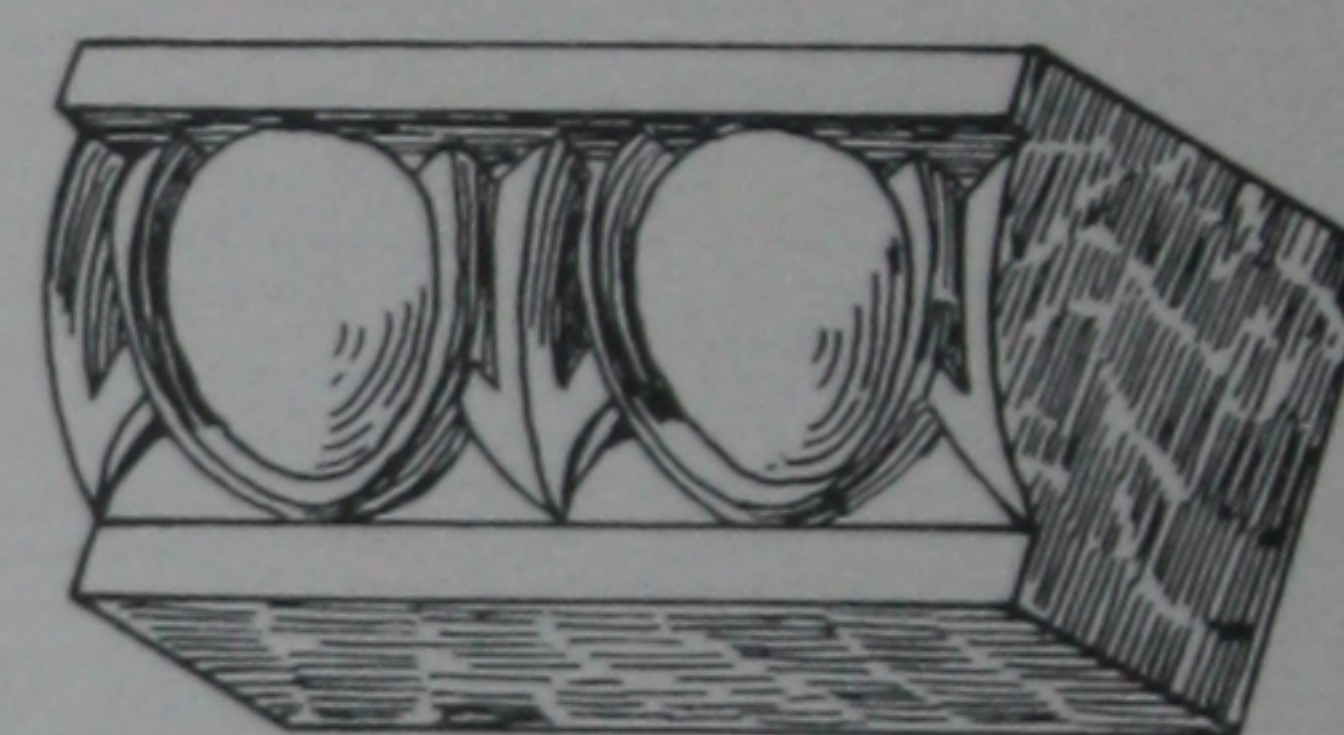
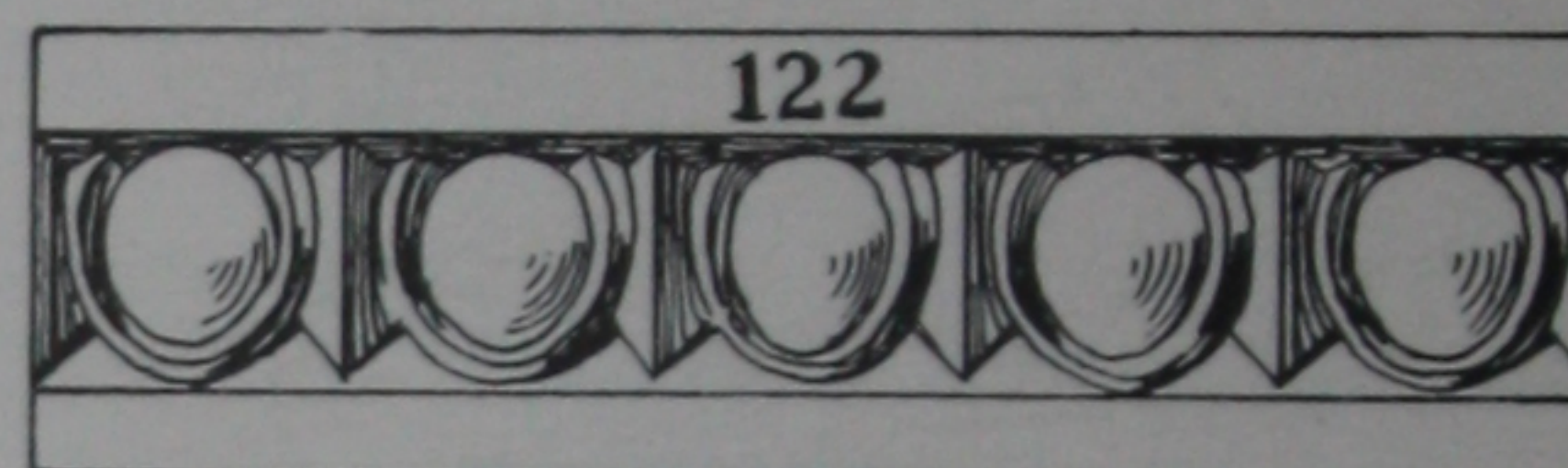
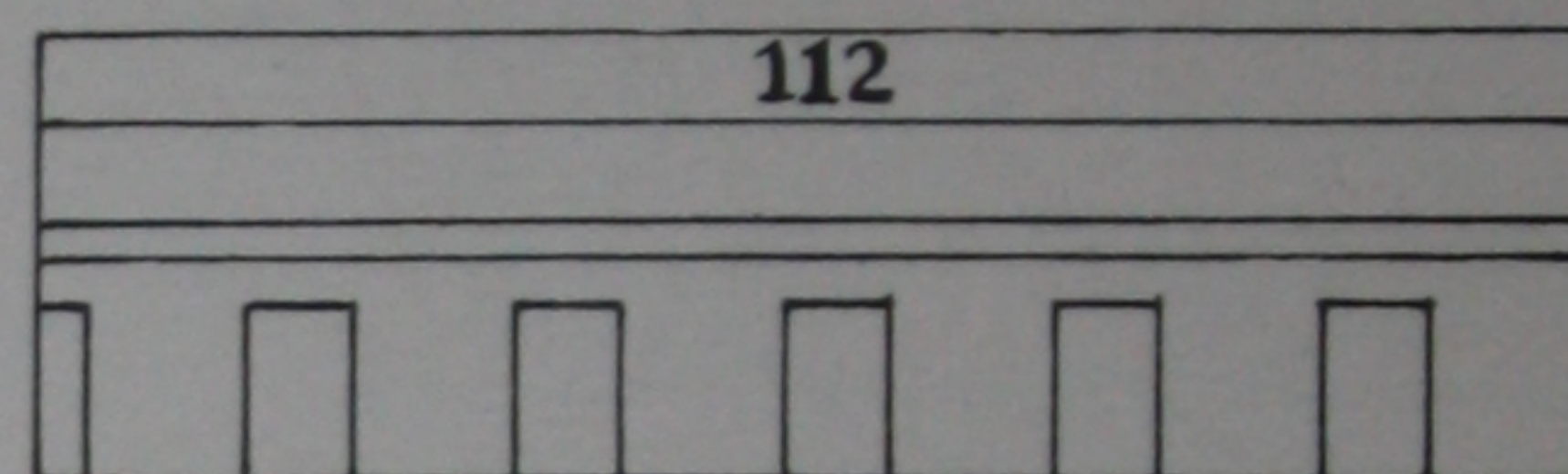
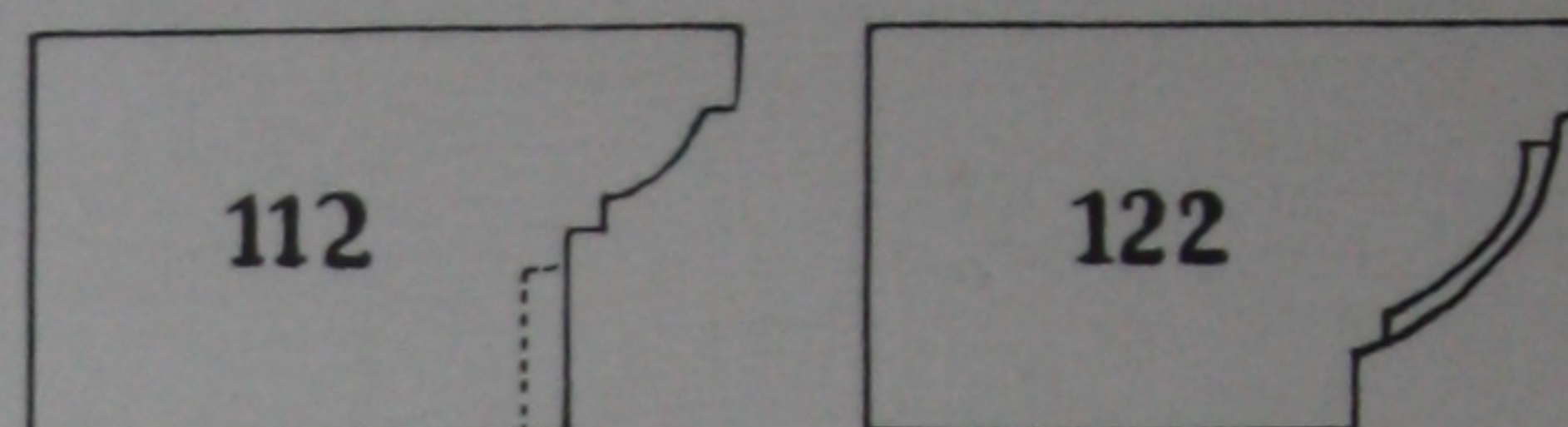
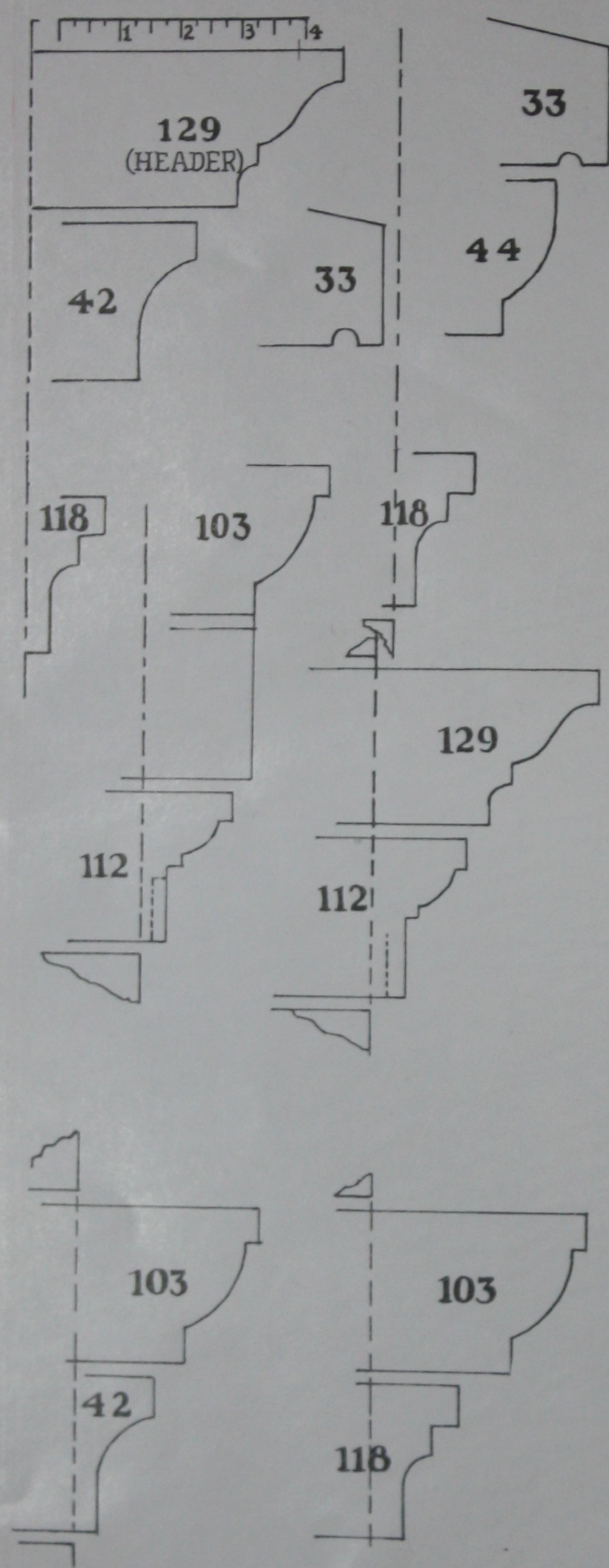
Standard Size Returns

No. 33 Stretchers

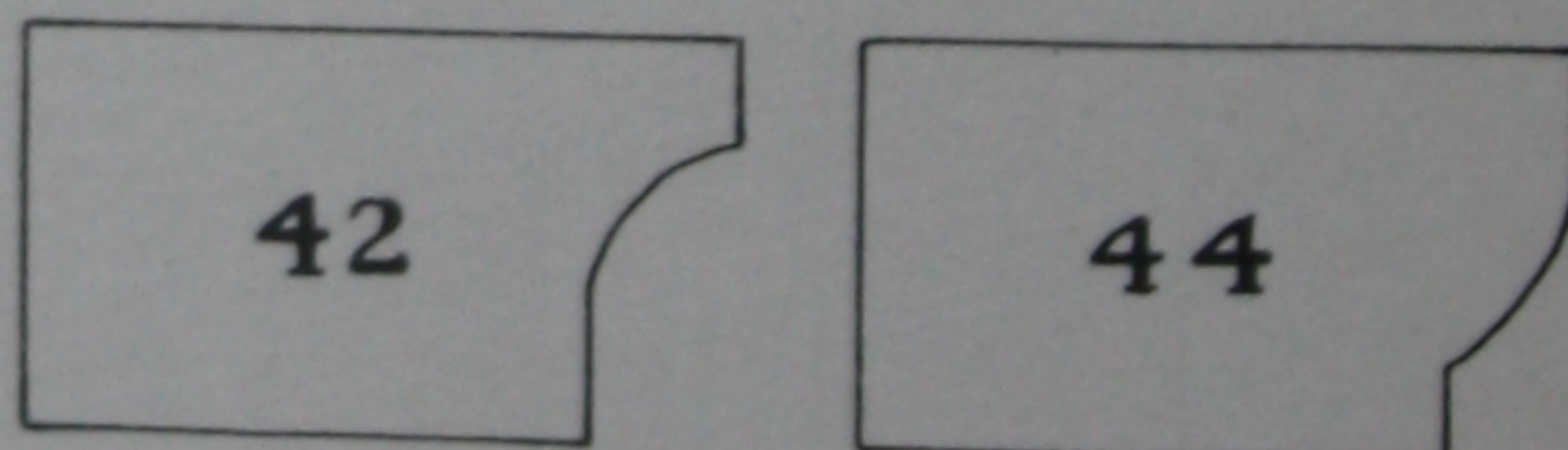
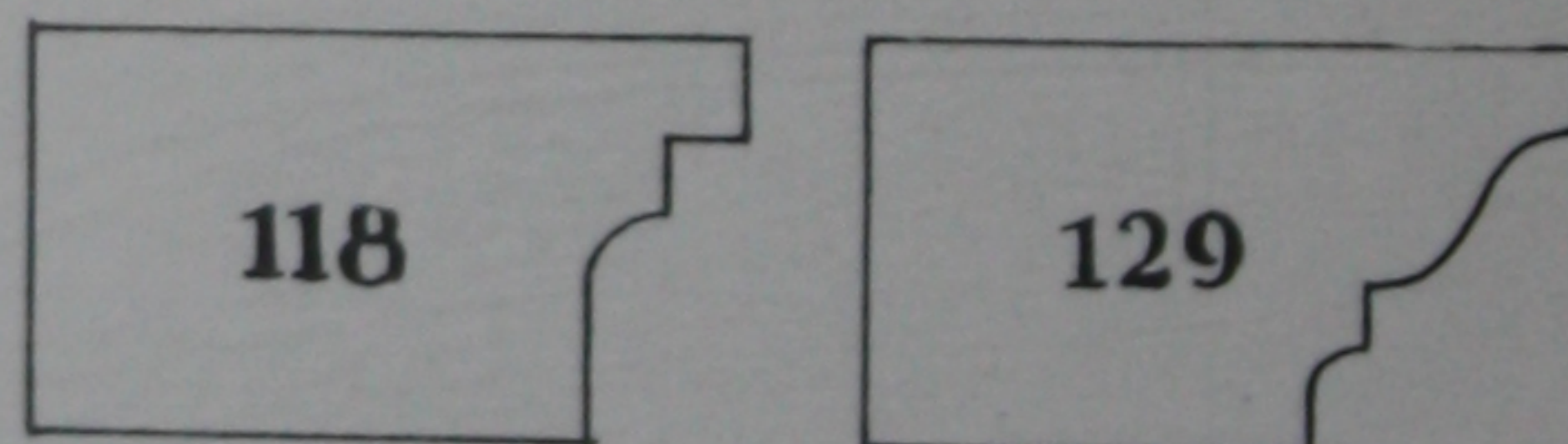
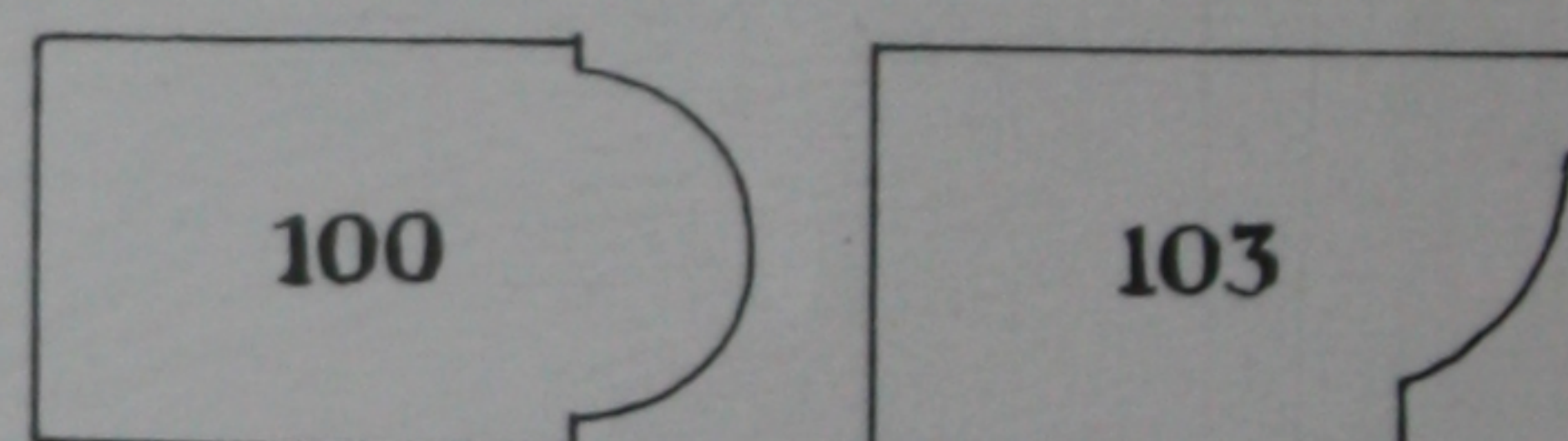
No. 33 Returns

**⌈ All Types made in Pressed,  
Glazed or Enameled Finish ⌋**



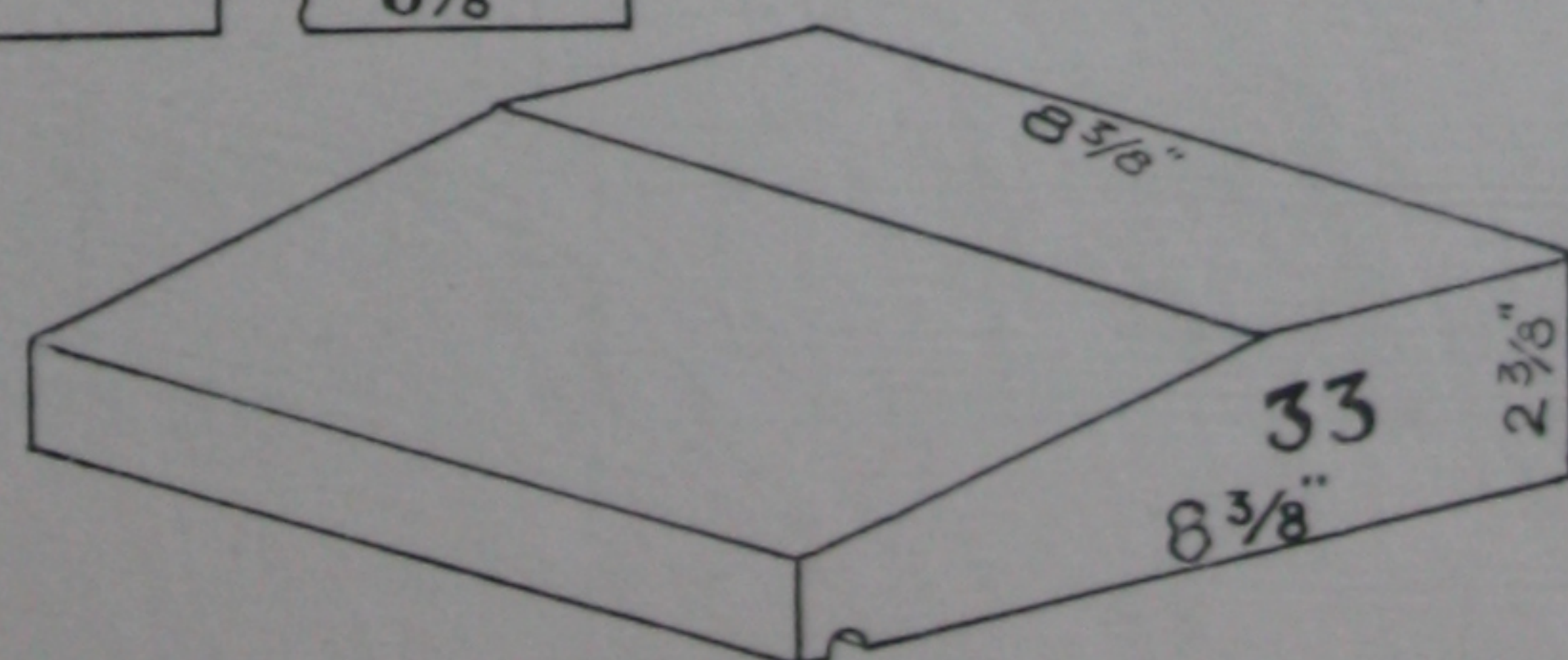
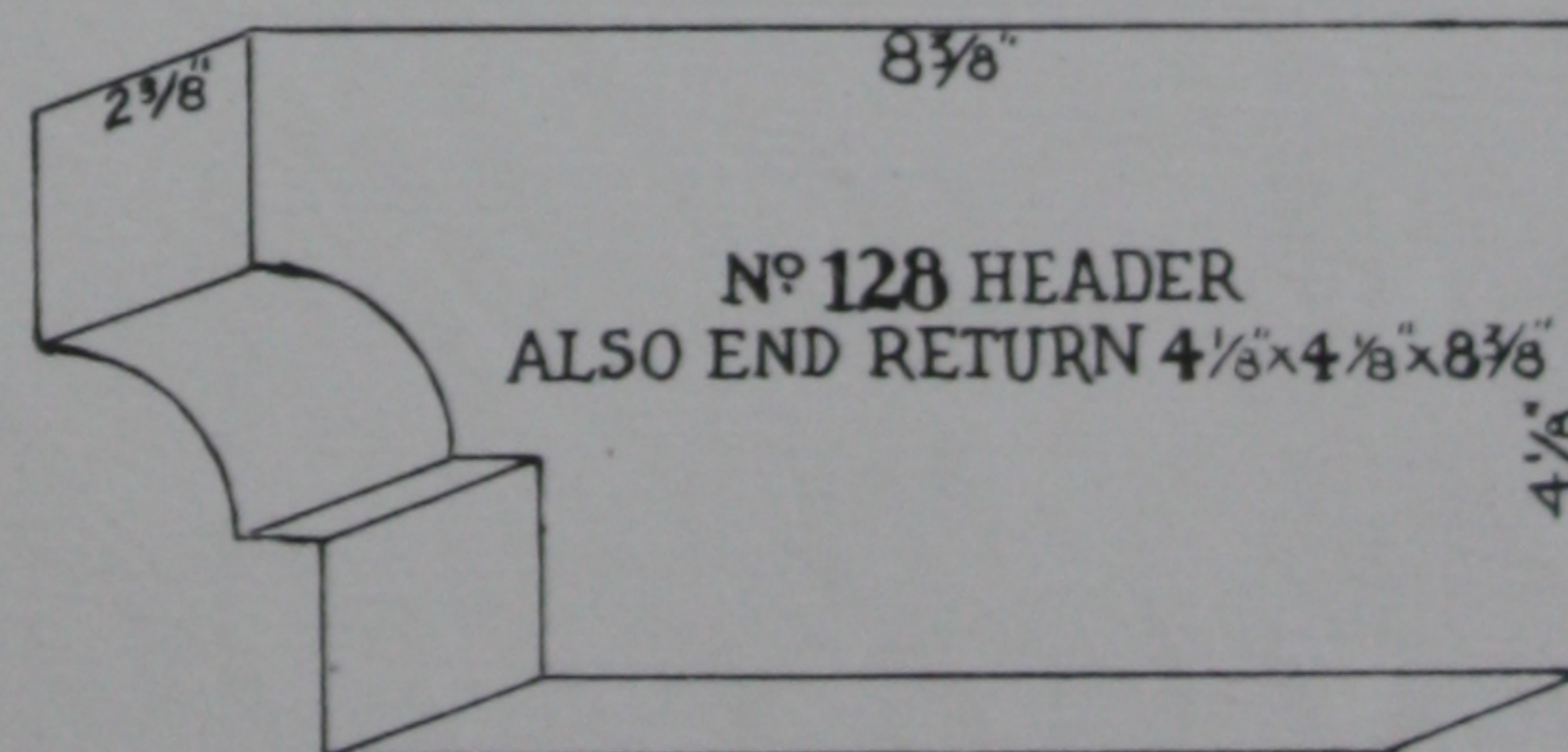
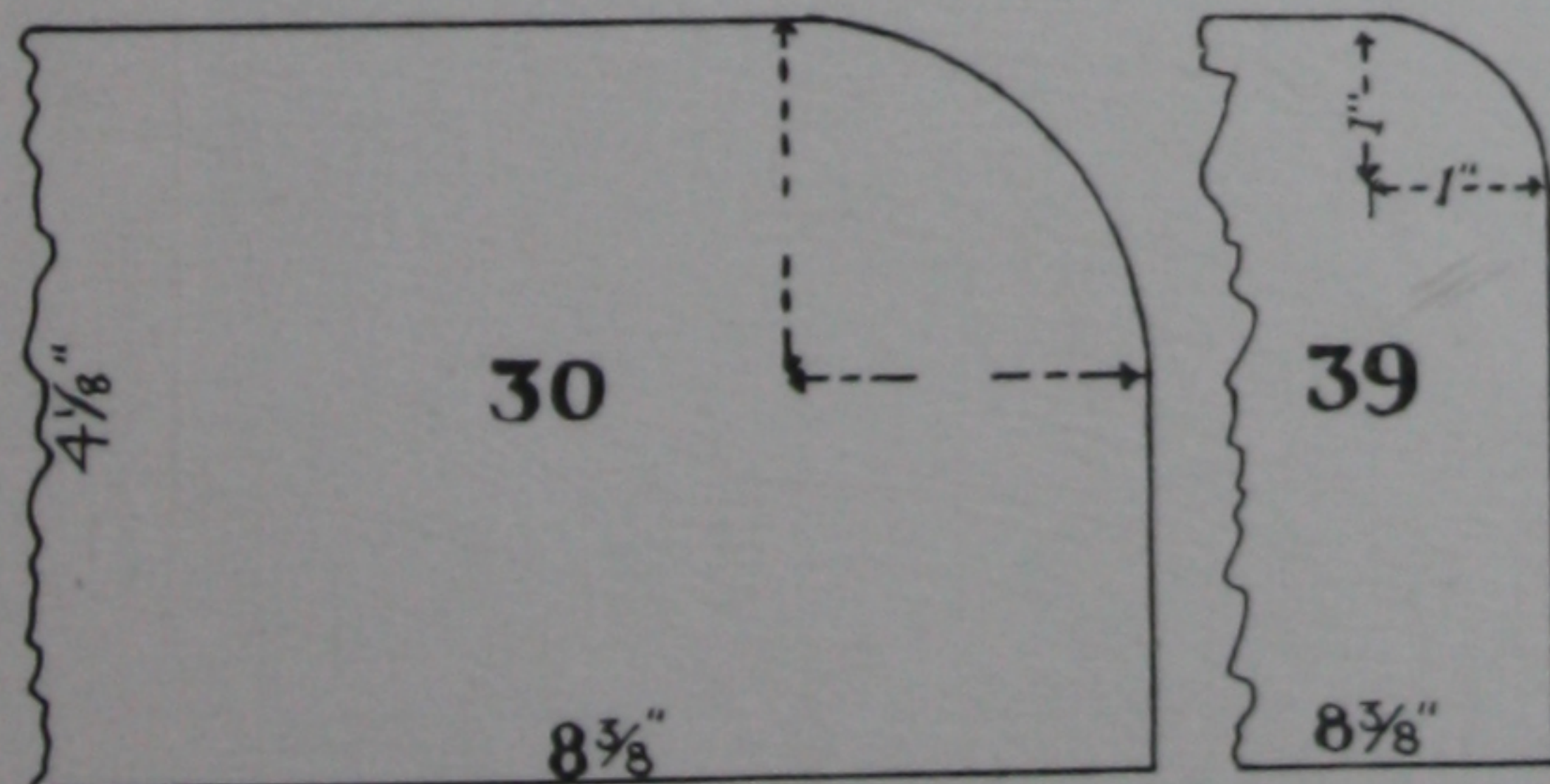
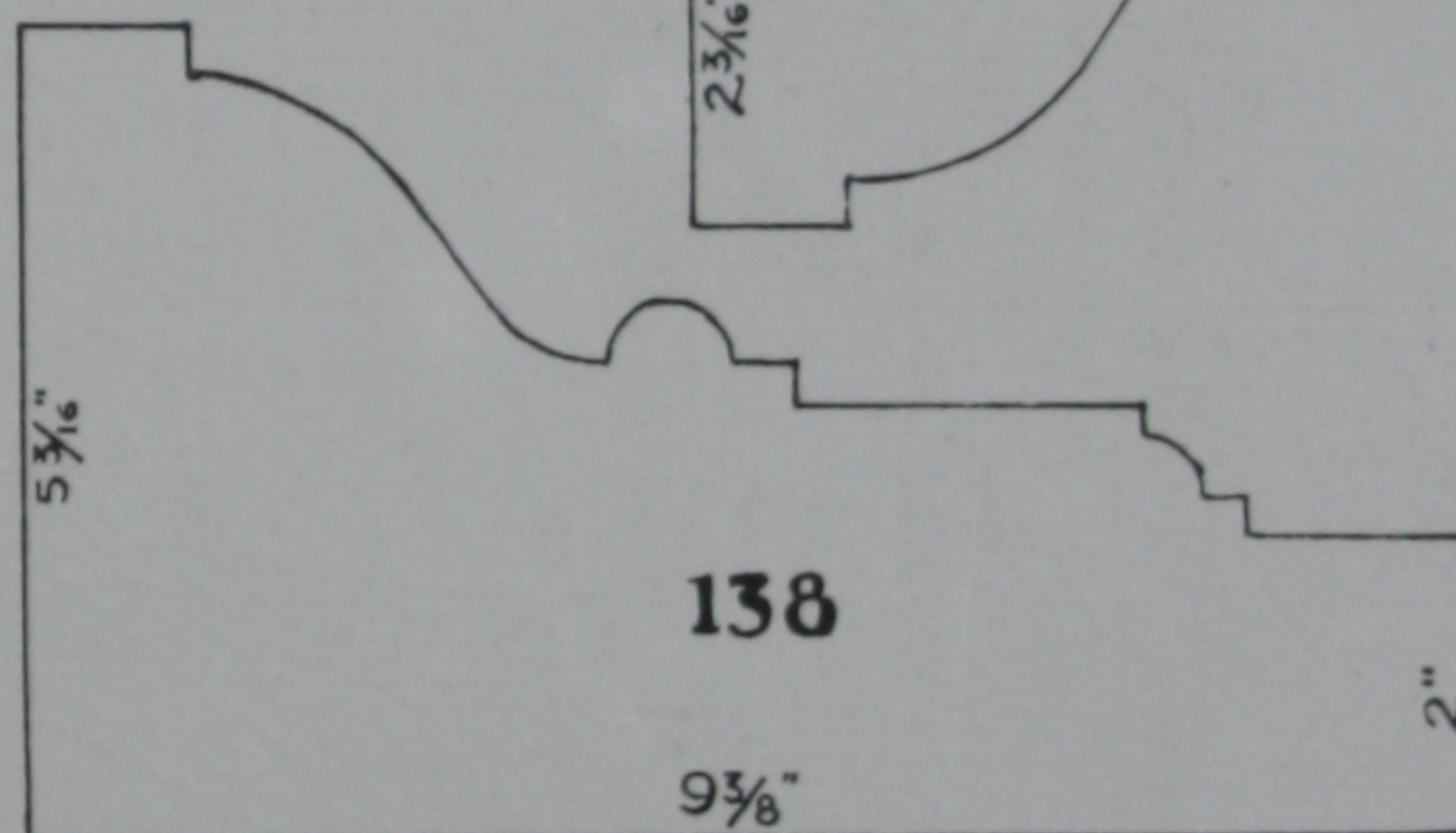
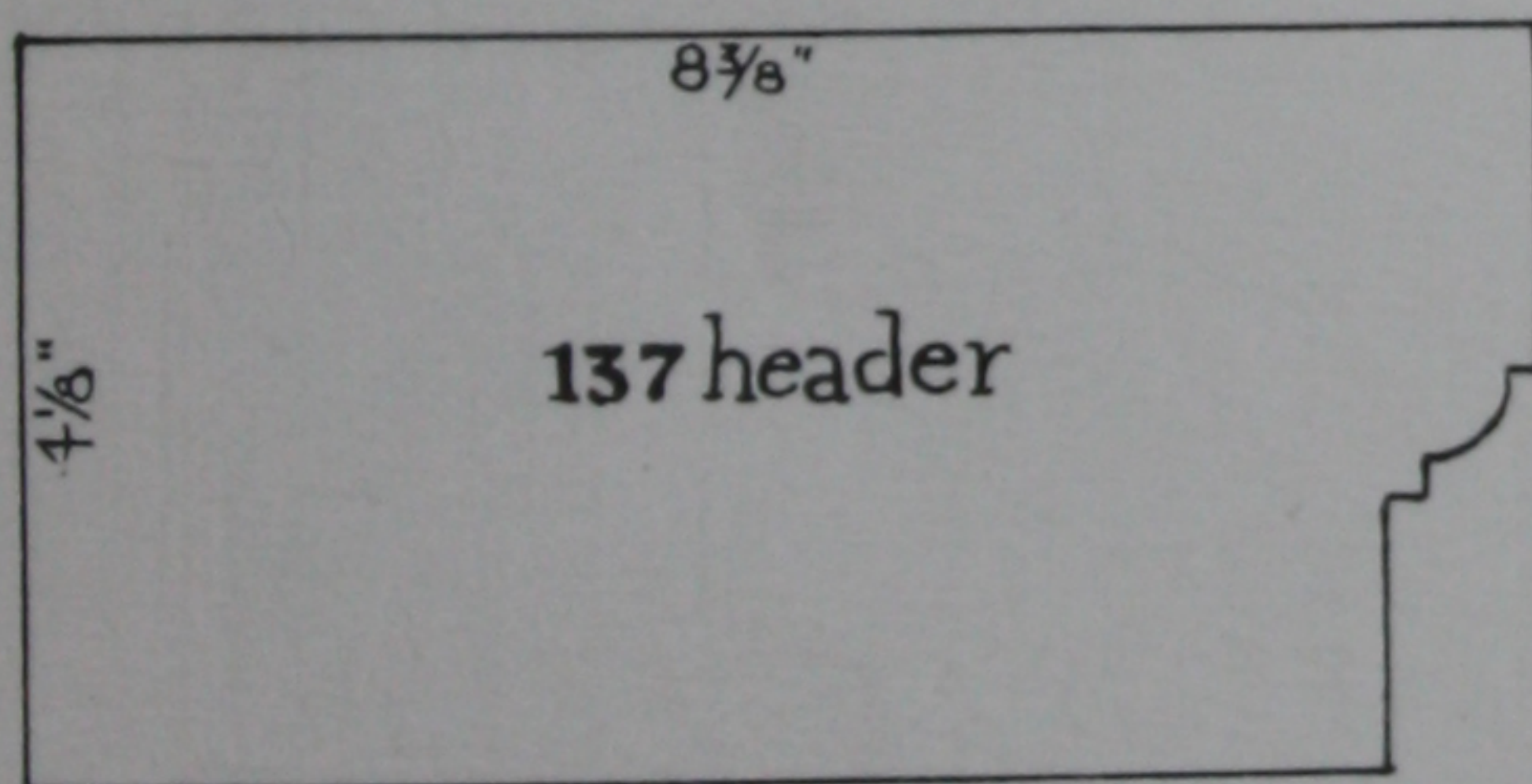
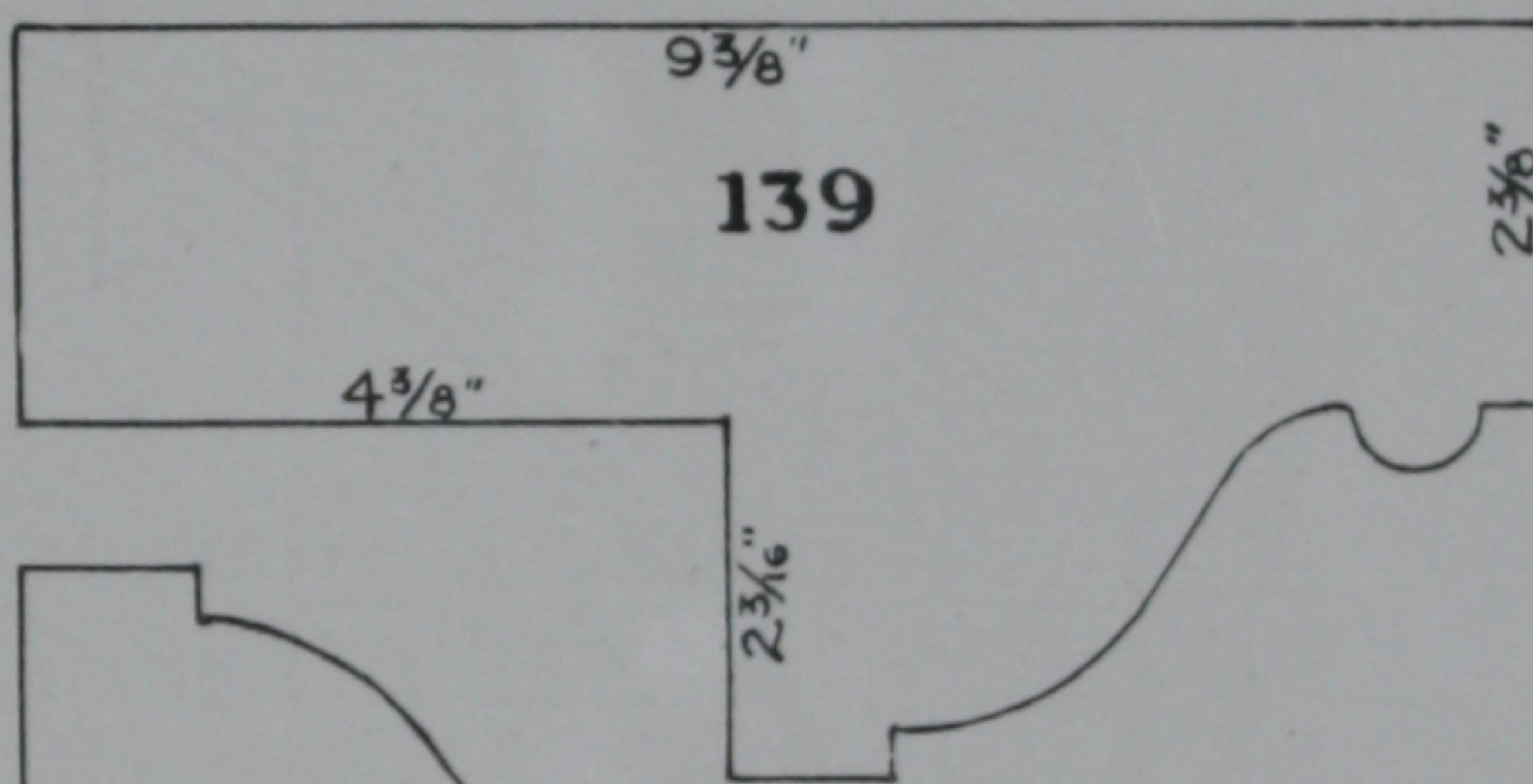
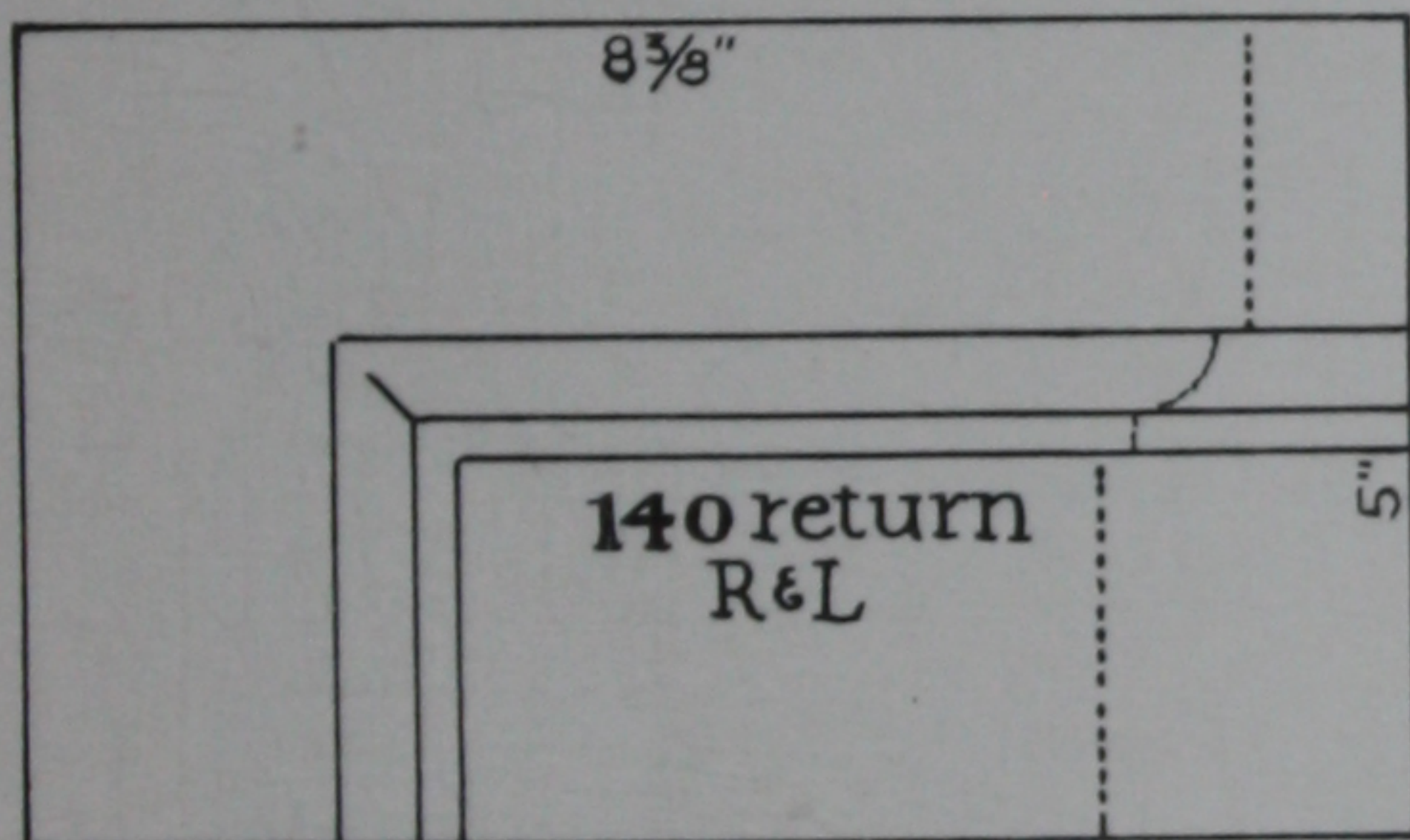
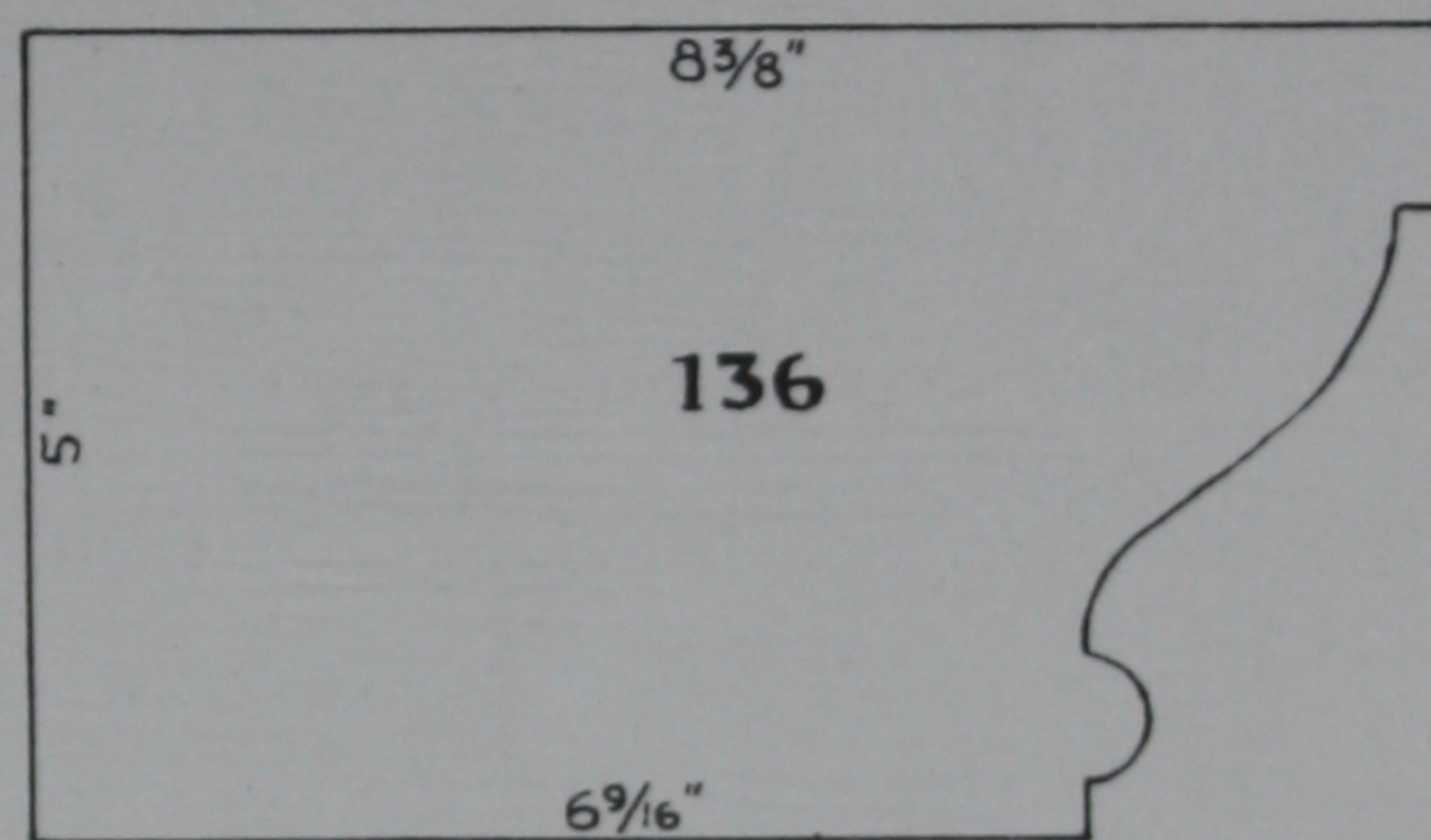
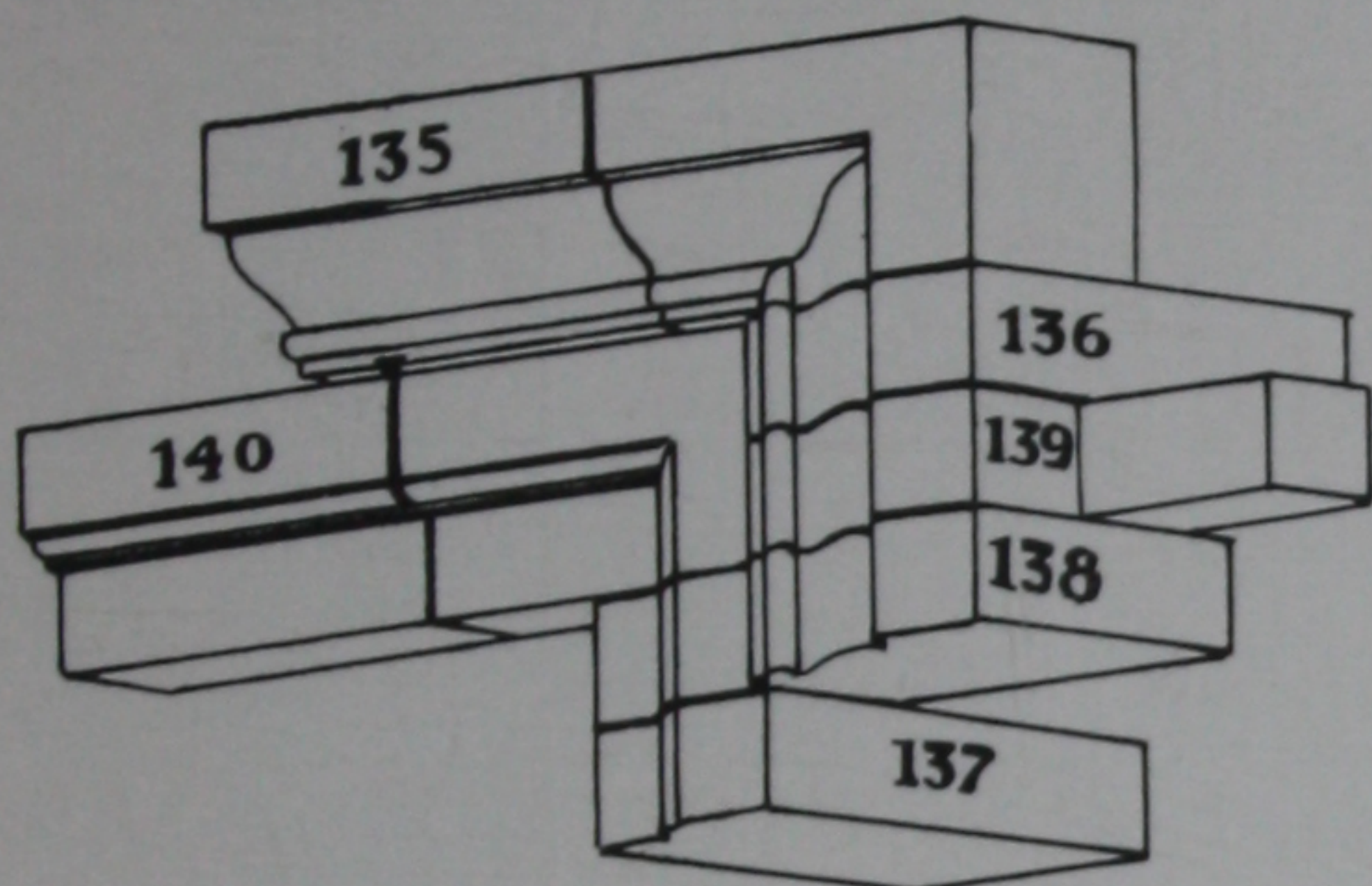
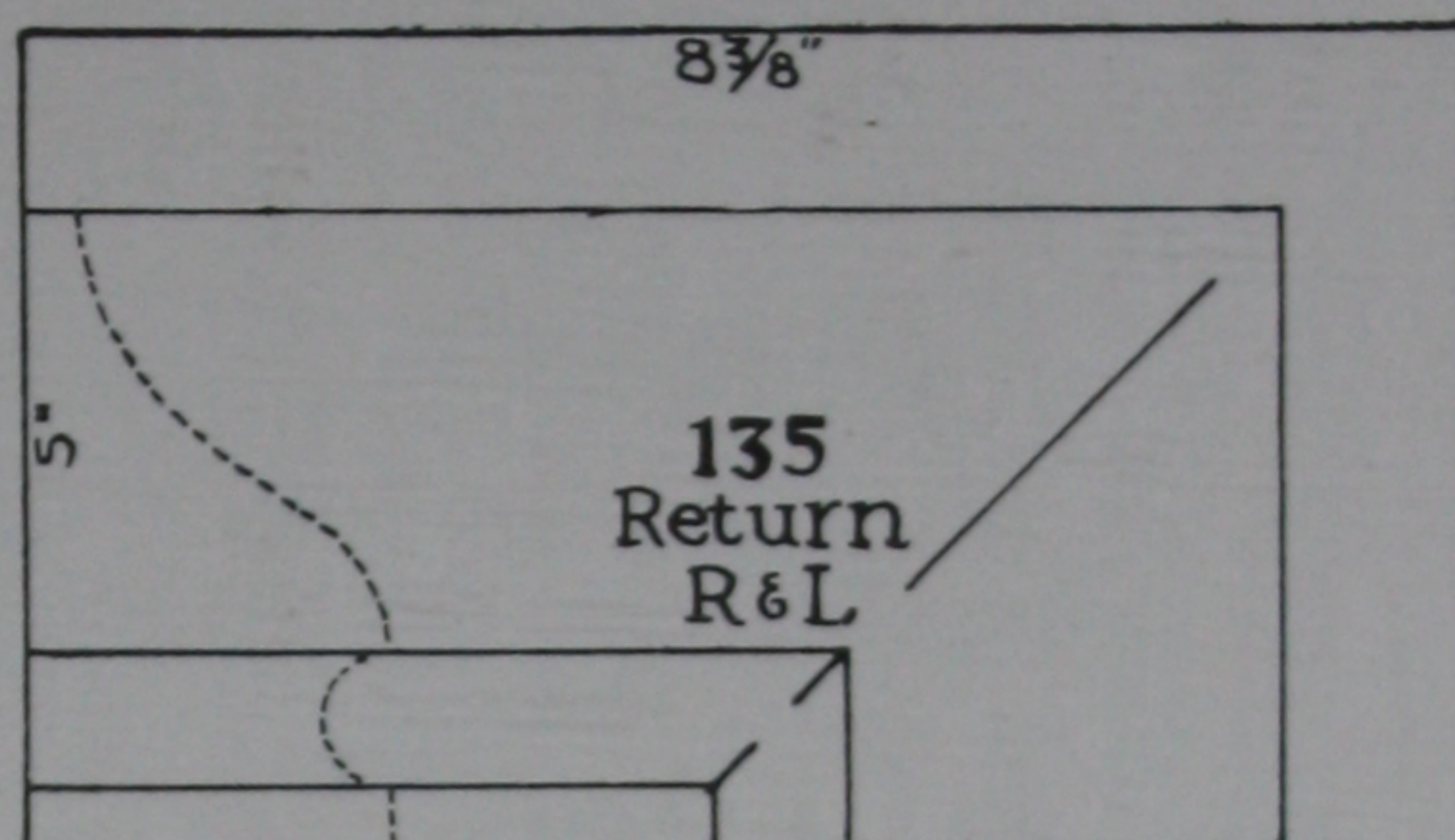
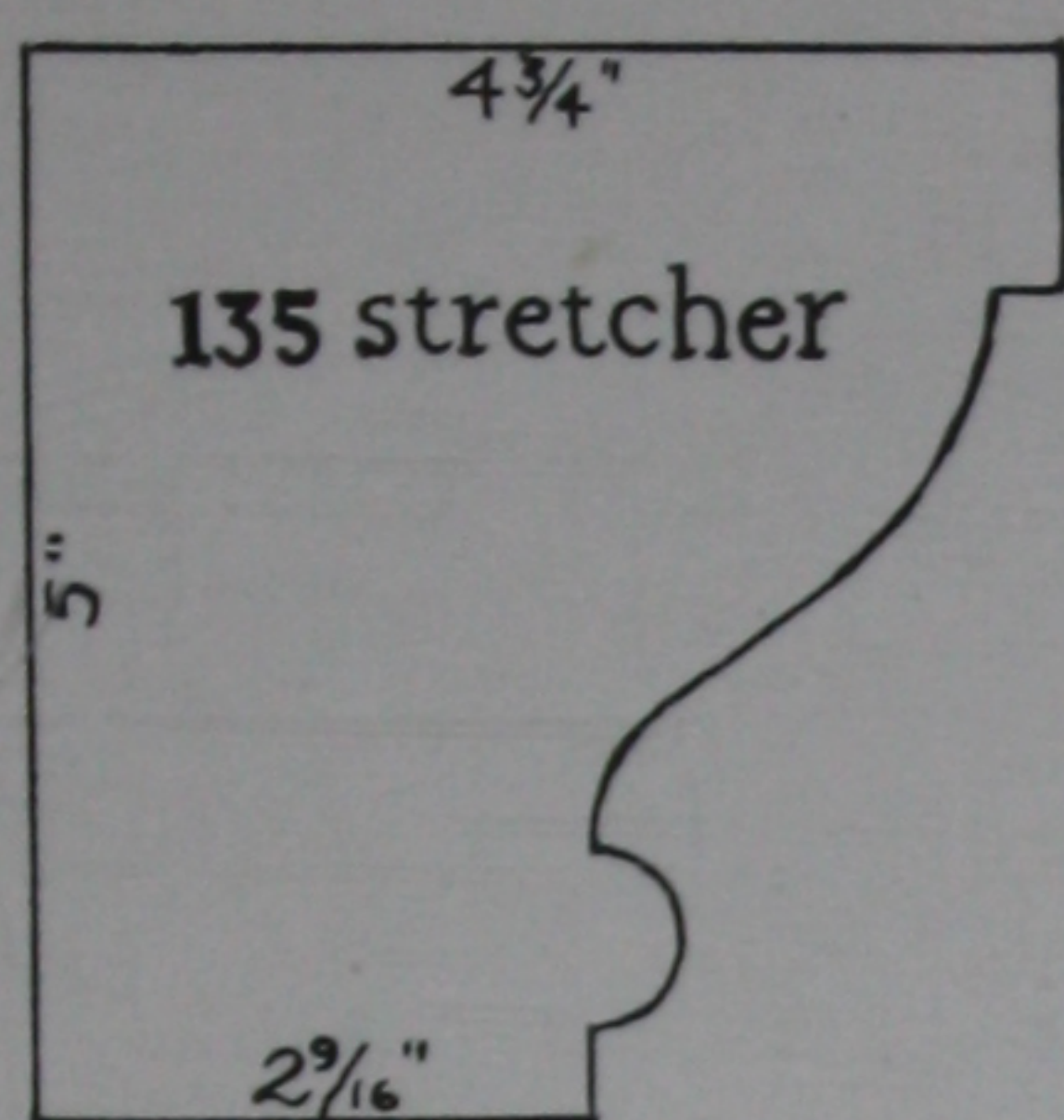
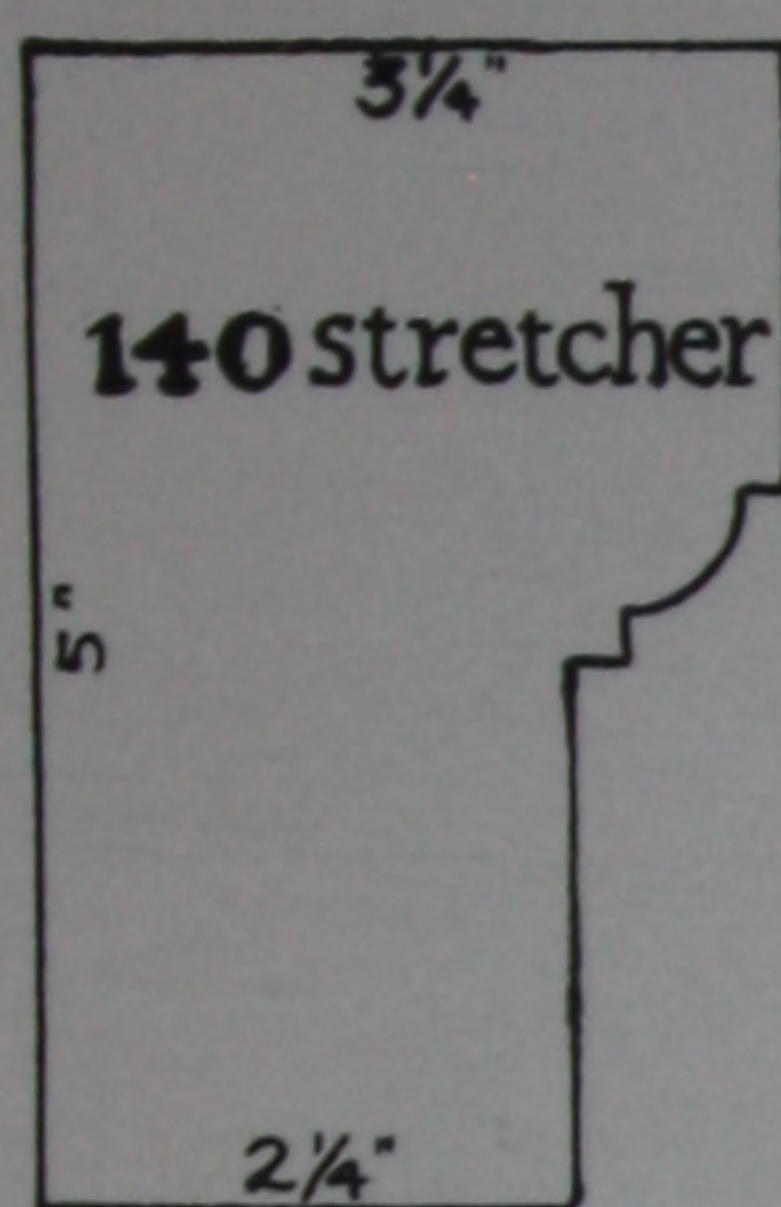


127  $8\frac{3}{8} \times 5 \times 4\frac{1}{8}$



*A*LL brick on this page except No. 33 and No. 127 are made in the standard size,  $2\frac{3}{8} \times 4\frac{1}{8} \times 8\frac{3}{8}$







## MODEL SPECIFICATIONS

¶ All facing brick shall be of Pacific Clay Products standard of quality or equal, of uniform size, with straight true edges, free from warp or wind, well made and hard burned.

¶ The color or colors shall be as selected by the architects and owners, samples of which must be marked and kept at brick yard for inspection until completion of the job.

¶ All brick work shall be laid in good grade of well gauged lime and cement mortar as specified in architect's specifications. ¶ All brick work shall be laid plumb and true to line. ¶ Where mortar color is used, it shall be a standard grade of metallic color, ground to 250 mesh and guaranteed not to fade. ¶ All joints shall be completely filled and pointed up in first class and workman-like manner. ¶ At the completion of the job brick shall be thoroughly washed down with a weak solution of muriatic acid and water and all cement and other foreign substance removed from the facing.

***Pacific Clay Products***

SUITE 650 CHAMBER  
OF COMMERCE BLDG.



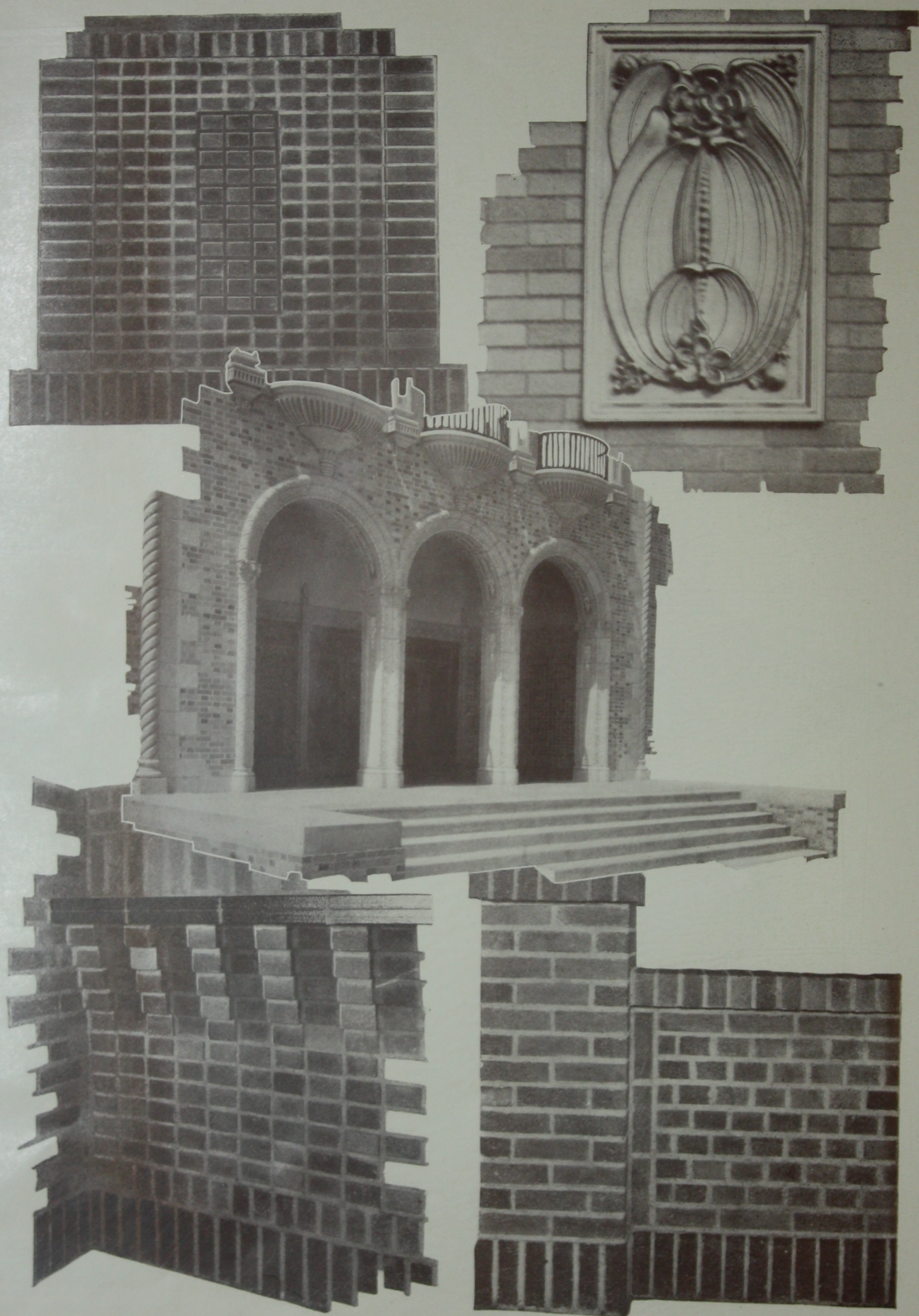
1151 SO. BROADWAY  
LOS ANGELES





PACIFIC Face Brick ☐ Ornamental Brick ☐ Roof Tile ☐ Fire Brick ☐ Fire Clay ☐ Flue Lining ☐ Sewer Pipe ☐ Drain Tile ☐









**P A C I F I C**  
FIRE CLAY FLUE LINING  
*and* CHIMNEY PIPE  
**CATALOG**



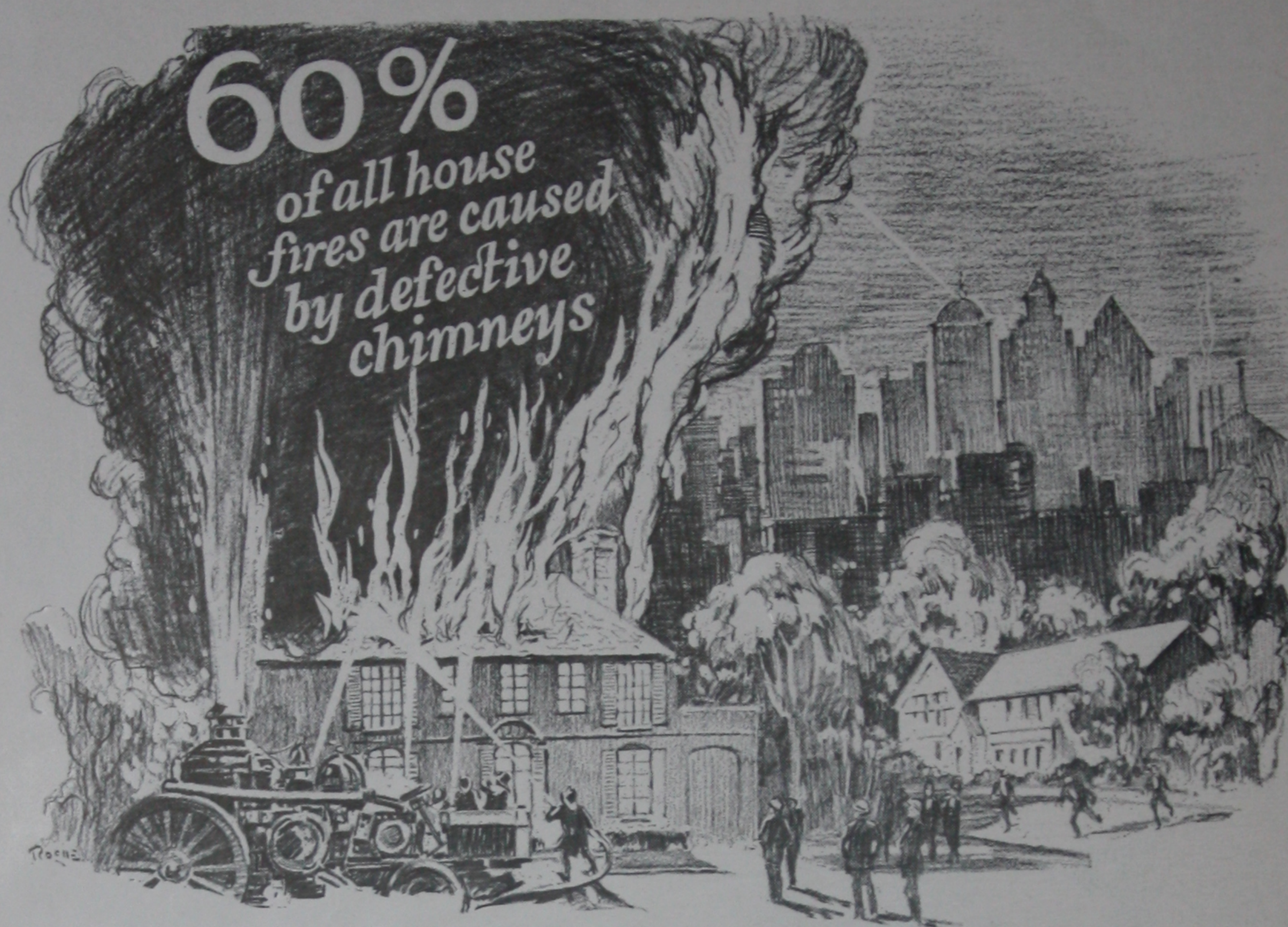
***Pacific Clay Products***

SUITE 650 CHAMBER  
OF COMMERCE BLDG.

1151 SO. BROADWAY  
LOS ANGELES

PACIFIC Face Brick ☐ Ornamental Brick ☐ Roof Tile ☐ Fire Brick ☐ Fire Clay ☐ Flue Lining ☐ Sewer Pipe ☐ Drain Tile ☐





## Fire Insurance Losses Paid in California 1911-25

	Population	Fire Losses Paid	Fire Losses Per Capita
1911.....	2,508,151	\$ 4,636,073.88	\$1.85
1912.....	2,616,234	5,640,942.16	2.16
1913.....	2,724,317	7,173,203.68	2.64
1914.....	2,832,400	6,829,088.49	2.41
1915.....	2,940,484	8,083,825.42	3.09
1916.....	3,048,568	5,927,308.78	1.94
1917.....	3,156,652	6,514,177.66	2.06
1918.....	3,264,736	7,589,904.41	2.32
1919.....	3,372,819	9,398,392.28	2.79
1920.....	3,480,902	12,217,526.05	3.51
1921.....	3,588,986	14,927,035.83	4.16
1922.....	3,697,070	13,102,557.07	3.54
1923.....	3,805,153	19,669,758.96	5.17
1924.....	3,913,236	21,228,259.80	5.43
1925.....	4,021,320	18,230,222.51	4.53
AVERAGE:			
1911-15.....	2,724,317	6,472,626.72	2.38
1916-20.....	3,264,755	8,329,461.83	2.55
1921-25.....	3,805,153	17,431,566.71	4.58





# Build Fire Insurance into Every Chimney with Pacific Clay Flue Lining

**F**IRE INSURANCE losses paid in California rose from \$1.85 per capita in 1911 to \$5.43 in 1924—nearly three-fold. Figured by five-year periods, they were as follows:

	Average Population	Average Annual Fire Losses	Losses Per Capita
1911-15.....	2,724,317	\$ 6,472,626.72	\$2.38
1916-20.....	3,264,755	8,329,461.83	2.55
1921-25.....	3,805,153	17,431,566.71	4.58

Notwithstanding regulations of the more important cities requiring fireproof construction in the more congested areas, fire hazards have increased, not only in California, but throughout the country, to an extent that has occasioned serious concern, and resulted in extensive and painstaking studies of fires, their causes, and how they may be prevented.

These investigations have shown that more fires start from defective chimneys than from any other single cause. Most cities now embody in their building codes stricter specifications for construction of chimneys, and the National Board of Fire Underwriters is rendering invaluable service in educational campaigns, which emphasize the vital importance of attention to this feature. Nevertheless too many houses continue to have flimsily built chimneys which menace the safety of the districts in which they are located.

A chimney's function is to conduct hot waste gases of combustion from the furnace, stove or fireplace into the open air. The chimney must be hot in order to maintain the draught necessary to serve its purpose. The materials forming it must be stable under the heat developed.

In chimneys built only of brick and mortar, the brick are sufficiently heat-resisting, but the mortar, composed of lime or cement and sand, is not. Consequently it may crack and crumble under the heat, affording leakage for the hot gases, or even permitting brick to fall out. In either case the hot gases may reach combustible parts of the structure and set it on fire.

This fire hazard is easily removed by building chimneys with fire clay flue lining set inside the brick. The lining covers the joints in the brickwork, insulates the mortar against excessive heat, and effectually protects all surrounding woodwork against the possibility of hot gases coming into contact with it.

The added expense is nominal. The few dollars spent for lining the chimneys of a Southern California home form an insignificant item in the cost of building it. It is a very small amount to pay for the added protection against fire.

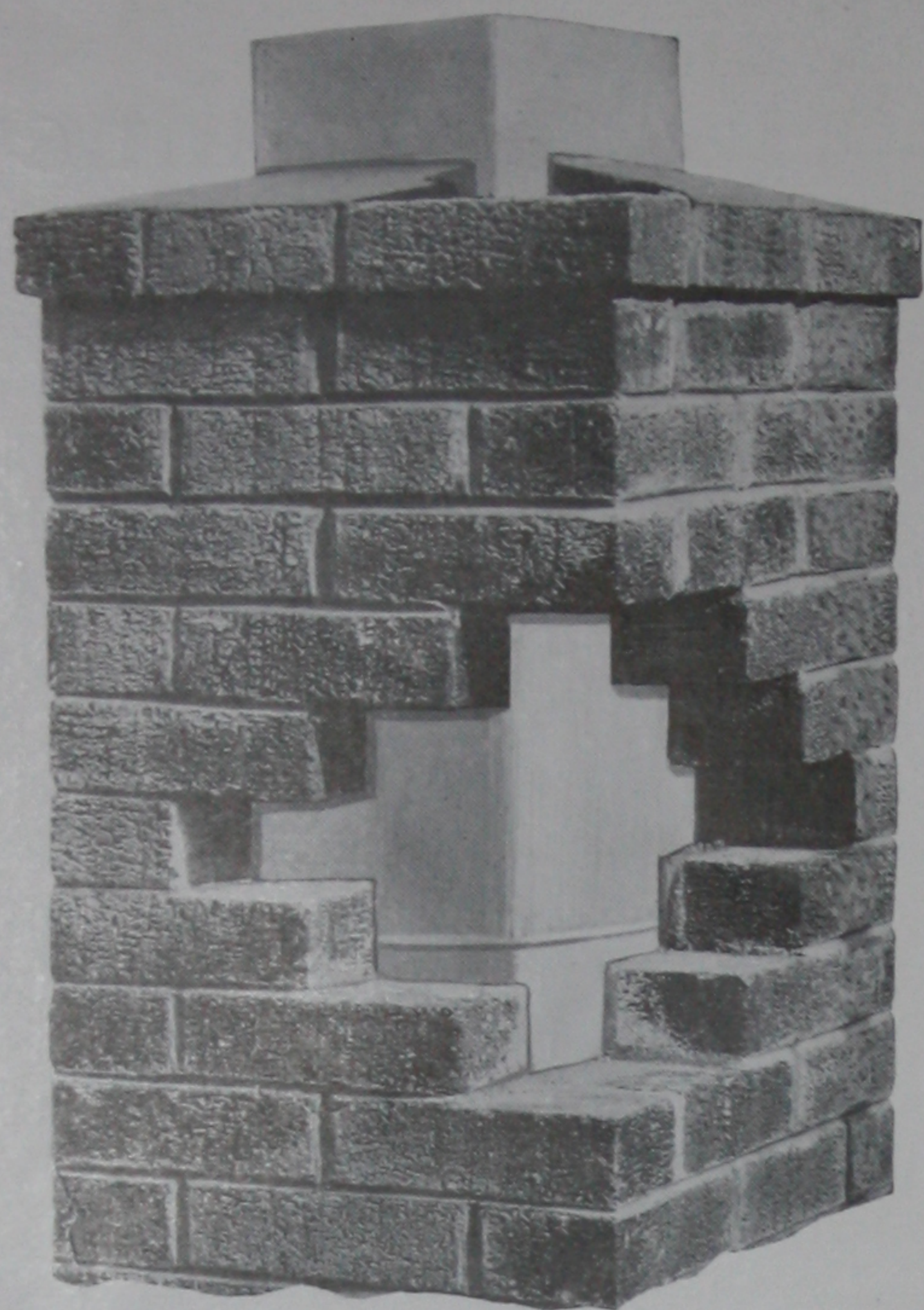
Chimneys for ordinary one and two-story buildings may also be built without brick by using round fire clay chimney pipe with sockets. A two-inch air space should be left between the chimney pipe and the nearest woodwork, and the pipe, whether set from the ground up, or supported on brackets, should rest upon a starting plate.

Gas is the universal domestic fuel in Southern California and its use is so convenient that many homes dispense altogether with regular chimneys and employ gas flues as outlets from heating and cooking stoves. These flues can be built in between the studding, are made with tongue and groove joint, which when cemented properly insures adequate protection against escape of the product of combustion. Gas flues should have at least 3/4-inch clearance from all woodwork.

"Pacific" Flue Lining, Gas Flues and Chimney Pipe are all made from special blends of clays selected for their refractoriness and low expansion. The resulting product has a softening point of above 3,000 deg. Fahrenheit, much higher than any possible temperature to which it might be exposed. It is strong, tough and durable. All the various sizes and types, and the fittings which are used with them, are well and carefully made, and closely uniform in dimensions. Flue lining is made in all standard sizes up to 24"x24", which is as large as







*Properly built chimney showing installation of Pacific Clay Flue Lining.*

should be used. Chimneys of larger section should be lined with fire brick, laid in fire clay mortar.

Extract from Ordinance for Construction of Chimneys recommended by National Board of Fire Underwriters:

"The walls or chimneys used for stoves, ranges, fireplaces, heating furnaces, or other heating appliances, whether the fuel used be wood, coal, oil or gas, shall be built of brick, concrete, stone, or hollow tile of such thickness and construction as is hereafter

specified. All chimneys, irrespective of which materials the walls are built, shall be lined with fire clay flue lining or with fire brick. The lining shall be made for the purpose and adapted to withstand high temperatures and the resultant gases from burning fuel.

"Solid brick or concrete chimney walls shall be not less than 4 inches thick, exclusive of flue linings. A standard size brick laid flatwise shall be deemed to fulfill this requirement for brick.

"Concrete chimneys cast in place shall be reinforced vertically and horizontally to avoid cracks liable to occur from temperature stresses or unequal settlement of foundations. The metal shall be thoroughly embedded in the concrete. Concrete blocks shall be similarly reinforced in both directions.

"Stone chimneys shall be at least 4 inches thicker than required for corresponding brick or reinforced concrete chimneys and shall have flue linings the same as for brick chimneys. Rubble stone chimney walls shall be not less than 12 inches thick.

"Fire clay flue linings shall be of standard commercial thickness, but not less than  $\frac{3}{4}$  inch, and without collars. The flue sections shall be set in mortar of quality above specified and shall have the joints struck smooth on the inside. The masonry shall be built around each section of lining as it is placed, and all spaces between masonry and linings shall be filled with mortar.





Flue linings shall start at least 12 inches below the bottom of the smoke pipe intakes of flues, or from the throats of fireplaces and shall be carried up continuously the entire heights of the flues, and 4 inches above top cappings to allow for a 2-inch wash and a 2-inch projection of lining. The wash or splay shall be formed of a rich cement mortar."

Extract from Building Code of the City of Los Angeles:

"All chimneys must have masonry walls at least eight (8) inches in thickness or shall have masonry walls at least four (4) inches in thickness and be lined on the inside thereof with well-burnt fire clay or terra cotta tile flue lining at least three-quarters ( $\frac{3}{4}$ ) of an inch in thickness.

"Unlined chimneys must be plastered from bottom to top on the inside, and plastered on the outside where not exposed to the weather.

"No smoke flue shall be less than 7 in. by 7 in., clear, inside dimensions, and only one thimble or inlet is allowed to any such flue. For two inlets the flue must be 7 in. by 11 in. wide. Only two inlets are allowed to any flue no matter how large.

"Thimbles must be  $\frac{3}{4}$  in. terra cotta, and be surrounded with 4 inches of masonry brought flush with the furring or inside of studding. Thimbles must be 6 inches from any woodwork.

"Terra cotta pipe chimneys may be erected on buildings outside of the Fire Districts. Such chimneys must be erected on a bracket placed on the

outside of the building so that the chimney will be completely exposed to the weather, except where it projects through the eaves to cornice, and through the wall of the building. Such chimneys must be attached to the building with iron straps and all portions of the pipe must be kept 2 inches away from all wood. Such chimneys must be  $\frac{3}{4}$  in. terra cotta pipe, without checks or cracks, have 6 inches of concrete in the bottom of the pipe resting on bracket, and must project 3 feet or more above the roof. Metal thimbles or flashing must be used at roof and wall to keep pipe 2 inches from wood.

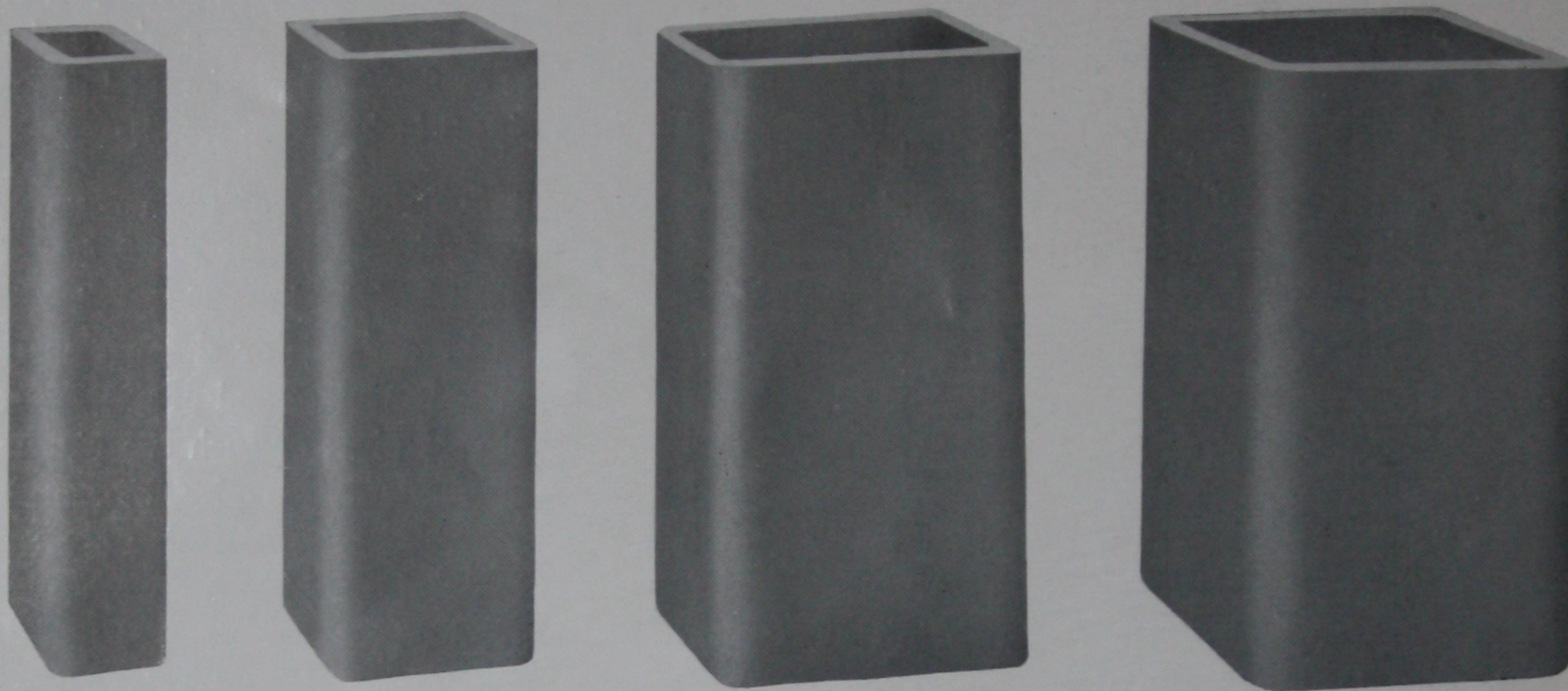
"Every vent flue shall be of terra cotta or concrete tile pipe, containing at least 2x6 inches of clear flue area, and shall be joined together and supported every 24 inches by a flange or sleeve securely fastened and cemented in place and projecting at least  $\frac{3}{4}$  inch beyond said pipe; or such tile pipe may be enclosed in a galvanized iron pipe, separated from the tile pipe by rigid spacers 24 inches apart and of sufficient size to provide a  $\frac{1}{2}$  inch air space between the two pipes, and with the sections of the tile pipe joined together by means of a galvanized iron sleeve or flange. Every tile pipe shall be  $\frac{1}{2}$  inch in thickness, and all galvanized iron shall be No. 24 U.S. standard gauge."

Battery of kilns where Pacific Flue Lining is burned.





## Fire Clay Flue Lining



*Illustrating four of the eleven standard sizes.*

Dimensions Outside (Inches)	Dimensions Inside (Inches)	Price Per Foot	Thickness Inches	Length Feet	Weight Foot Pounds
4½ x 8½	3 x 7	\$0.35	¾	2	15
4½ x 13	3 x 11½	.45	¾	2	23
4½ x 17	2½ x 15	.70	1	2	29
8½ x 8½	7 x 7	.45	¾	2	20
8½ x 13	7 x 11½	.65	¾	2	33
8½ x 17	6½ x 15	.85	1	2	38
13 x 13	11 x 11	1.00	1	2	35
13 x 17	11 x 15	1.25	1	2	48
17 x 17	14¾ x 14¾	1.75	1⅛	2	57
17 x 21	14¾ x 19½	2.25	1⅛	2	64
21 x 21	19½ x 19½	3.00	1⅛	2	71

Tapered tops, any size, made to order at four times the price of one foot of flue lining.  
A charge of one foot additional is made for inlets.







## Fire Clay Gas Flues

### Made with Tongue and Groove Joints

The T & G Joint for Gas Flues insures absolute protection from escaping gas fumes. This is the only proper joint for gas flues.

Dimensions Outside (Inches)	Dimensions Inside (Inches)	Price Per Foot	Weight Per Foot	Tees Each	Ells Each	Offsets Each
$2\frac{3}{4} \times 7\frac{1}{4}$	$1\frac{1}{4} \times 5\frac{3}{4}$	\$0.20	10 lbs.	\$0.80	\$0.60	\$1.20
$3\frac{3}{4} \times 5\frac{1}{4}$	$2\frac{1}{4} \times 3\frac{3}{4}$	.20	10 lbs.	.80	.60	1.20
$3\frac{3}{4} \times 7$	$2\frac{1}{4} \times 5\frac{1}{2}$	.30	12 lbs.	1.20	1.00	1.50
$3\frac{3}{4} \times 7\frac{3}{4}$	$2\frac{1}{4} \times 5\frac{3}{4}$	.30	14 lbs.	1.20	1.00	1.50
$4\frac{1}{2} \times 8\frac{1}{2}$	3 x 7	.40	15 lbs.	1.60	....	....

This tables applies to all items.

$2\frac{3}{4} \times 7\frac{1}{4}$  for 3-inch studding. Single inlet.

$3\frac{3}{4} \times 5\frac{1}{4}$  for 4-inch studding. Single inlet.

$3\frac{3}{4} \times 7$  for 4-inch studding. Double inlet.

$5\frac{1}{2} \times 8\frac{1}{2}$  for gas furnace flues.

Above sizes made to conform to Los Angeles City Building Ordinances.





# Fire Clay Chimney Pipe and Fittings



Double T

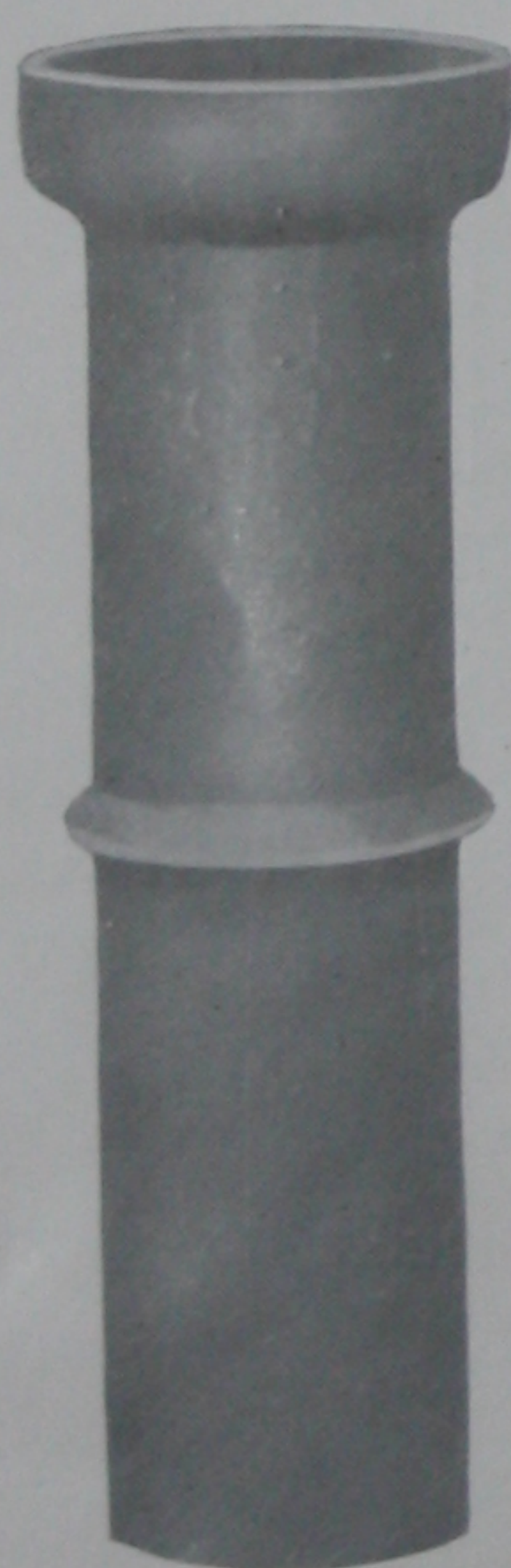


T



Straight Pipe  
without Socket

Inside Diameter Inches	Plain or Socket Pipe Per Foot	T's 2 ft. long Each	Double T's 2 ft. long Each	Bottom Pipe 2 ft. long Each	Offsets Each	Elbows Each	Weight, Pipe Per Foot Pounds
3	\$0.20	\$0.80	\$1.20	\$0.80	.....	\$0.80	7 lbs.
4	.30	1.20	1.80	1.20	.....	1.20	9 lbs.
5	.35	1.40	2.10	1.40	\$1.75	1.40	14 lbs.
6	.40	1.60	2.40	1.60	2.00	1.60	16 lbs.
8	.55	2.20	3.30	2.20	2.75	.....	22 lbs.
10	.75	3.00	4.50	3.00	.....	.....	30 lbs.
12	1.00	4.00	6.00	4.00	.....	.....	42 lbs.



Bottom  
Pipe



Offset



Socket  
Pipe





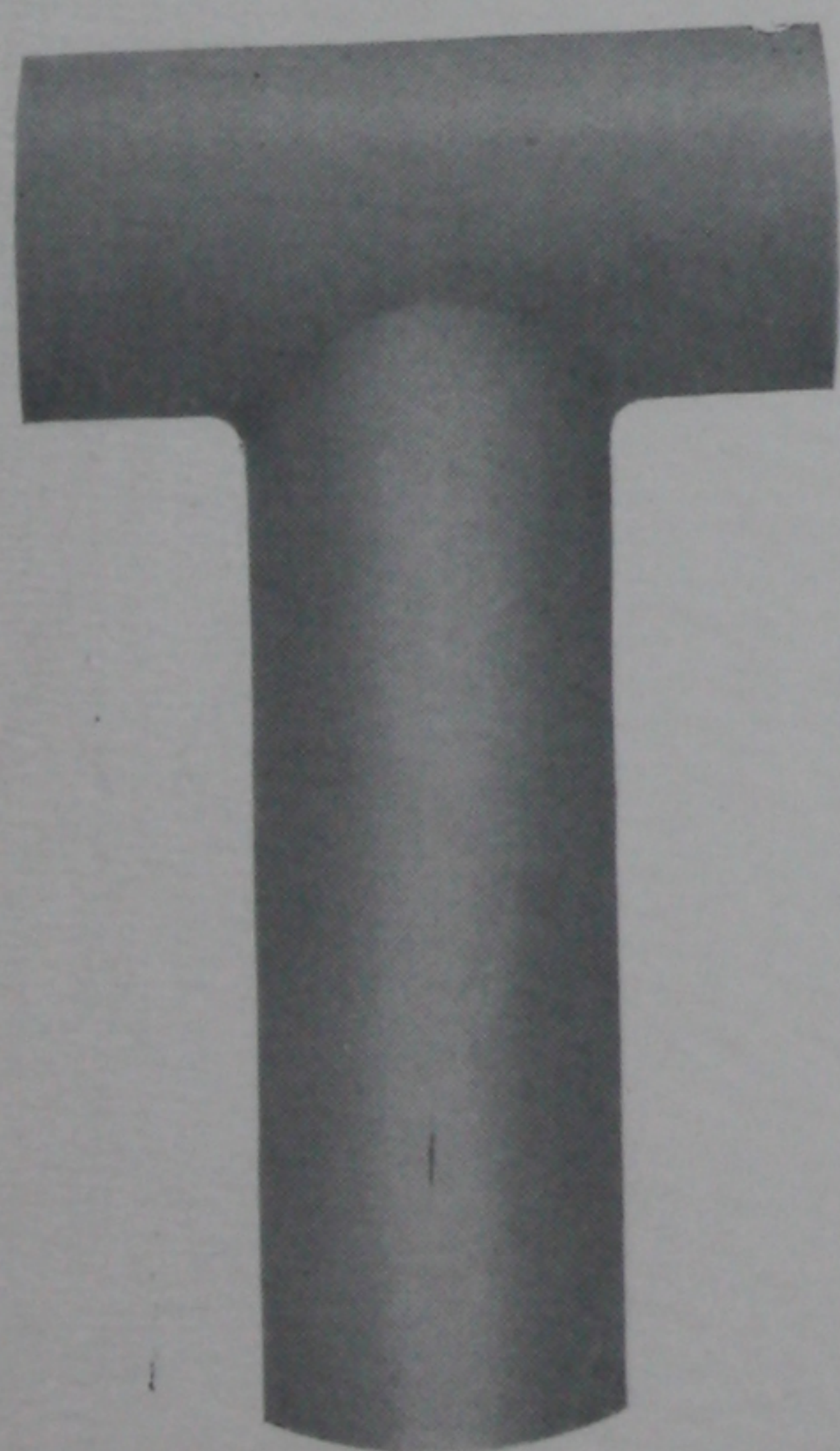
## Fire Clay Starting Plates



*Made in three sizes.*

12x12", for supporting 5" Chimney Pipe, with hole or solid.....	\$0.60
13x13", for supporting 6" Chimney Pipe, with hole or solid.....	.75
14x14", for supporting 8" Chimney Pipe, with hole or solid.....	1.00

## Bonnet Tops and Caps



Bonnet Top

*Made in five sizes.*

Inside Diameter Inches	Bonnet Tops Each	Caps Each
3	\$1.20	\$1.25
4	1.80	1.50
5	2.10	1.75
6	2.40	2.00
8	3.30	3.00
10	....	3.50
12	....	4.00



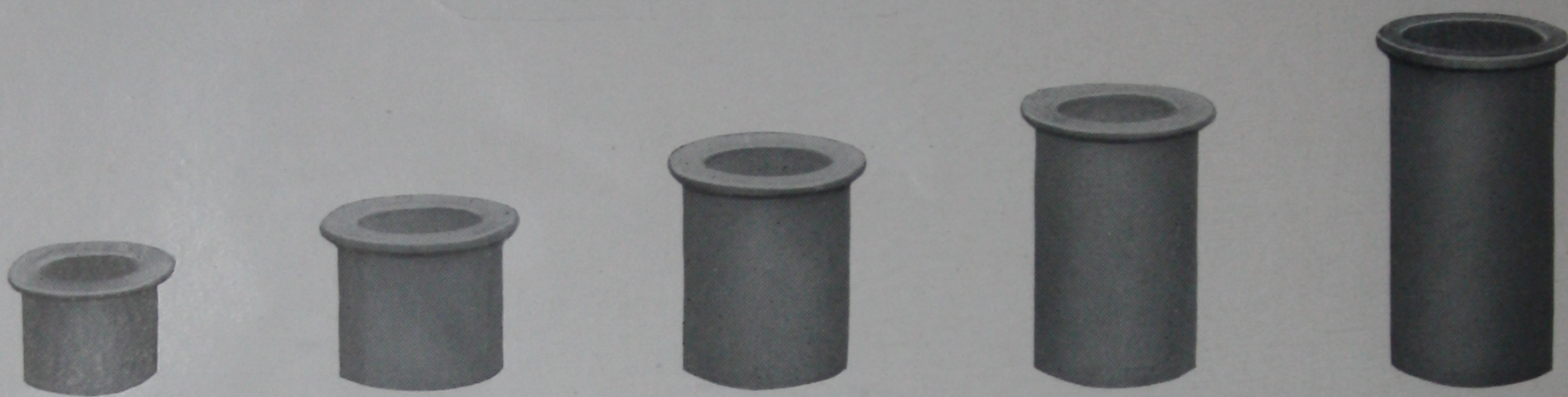
Cap

*Caps made in seven sizes.*





## Fire Clay Thimbles



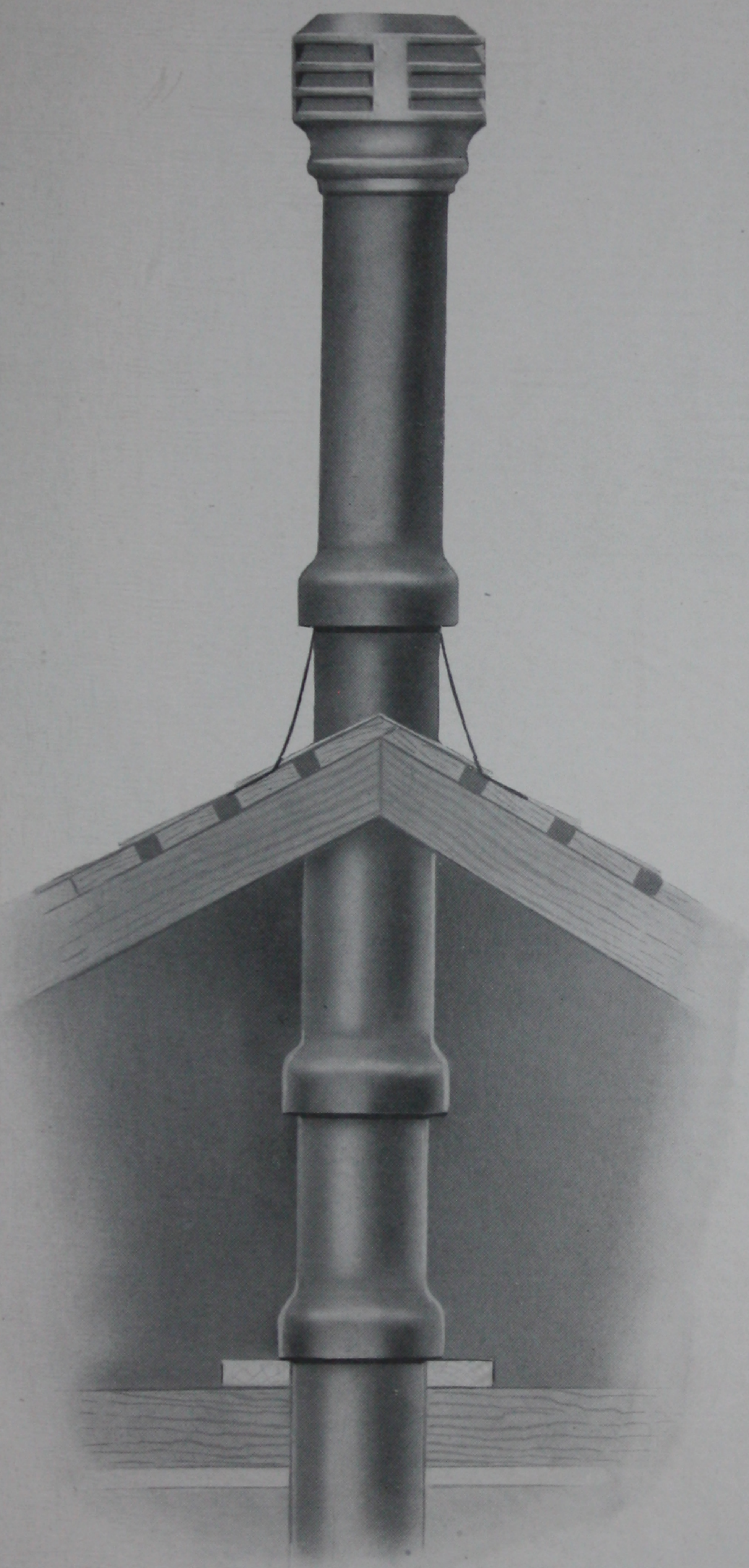
*Made in Five Lengths and Seven Different Sizes.*

Diameter Inside	4 Inches Long	6 Inches Long	8 Inches Long	10 Inches Long	12 Inches Long
4 inches	\$0.30	\$0.40	\$0.50	\$0.60	\$0.70
5 "	.30	.40	.50	.60	.70
6 "	.40	.50	.60	.70	.80
7 "	.50	.60	.70	.80	.90
8 "	.60	.70	.80	.90	1.00
10 "	.80	.90	1.00	1.10	1.20
12 "	1.00	1.10	1.20	1.30	1.40

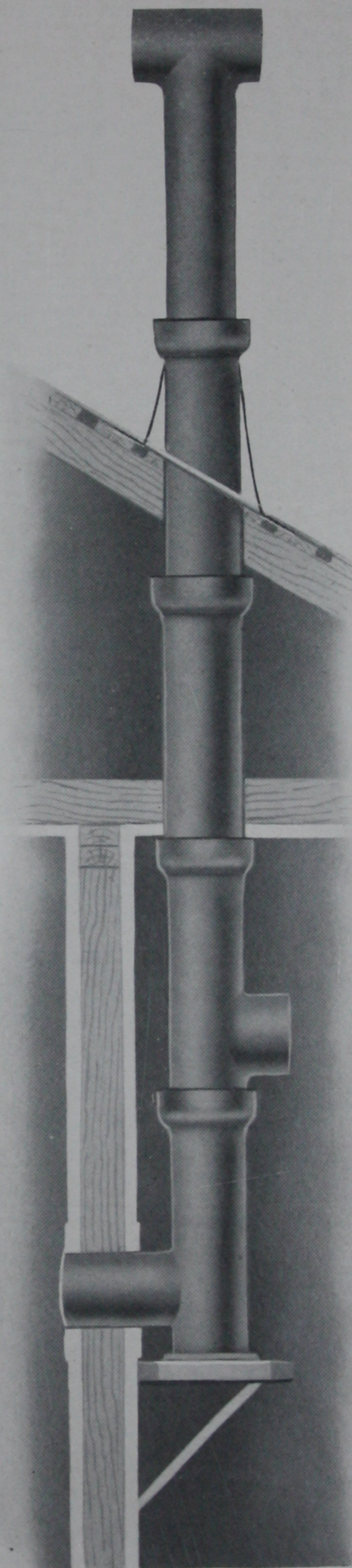




# Pacific Fire Clay Chimneys



No. 1 illustrates use of bottom joint.



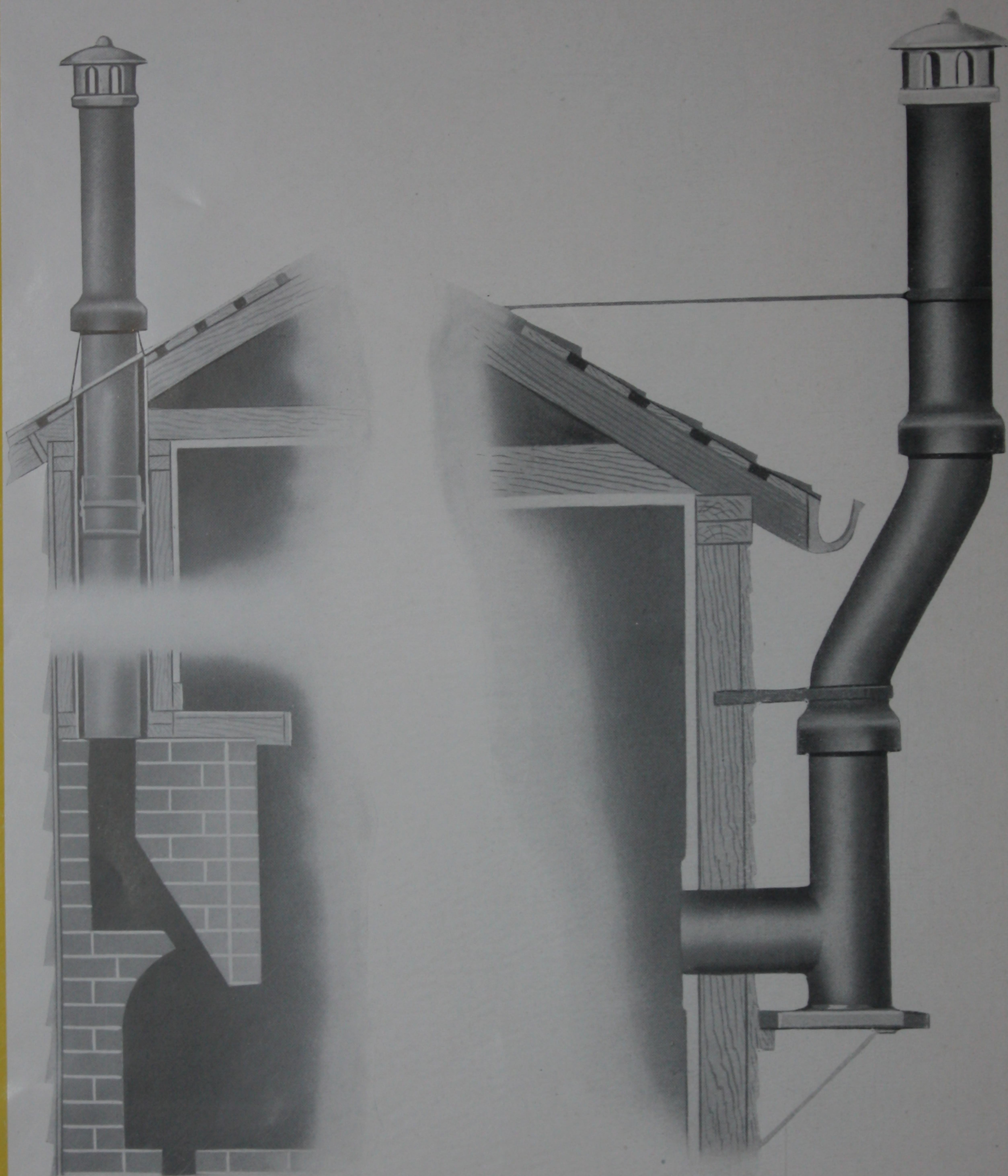
No. 2 illustrates interior use of tees for double dwellings.



PACIFIC Face Brick ☐ Ornamental Brick ☐ Roof Tile ☐ Fire Brick ☐ Fire Clay ☐ Flue Lining ☐ Sewer Pipe ☐ Drain Tile ☐



## Pacific Fire Clay Chimneys



*No. 3 illustrates use of chimney pipe with galvanized iron casing.*

*No. 4 illustrates exterior use of tee and offset.*





"Best on...or Below...the Earth"



**PACIFIC**  
*Vitrified Salt Glazed*  
**SEWER PIPE**  
**CATALOG**

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***Pacific Clay Products***

SUITE 650 CHAMBER  
OF COMMERCE BLDG.

1151 SO. BROADWAY  
LOS ANGELES



PACIFIC Face Brick ☐ Ornamental Brick ☐ Roof Tile ☐ Fire Brick ☐ Fire Clay ☐ Flue Lining ☐ Sewer Pipe ☐ Drain Tile ☐





*Partial view of storage yard at Los Nietos Plant of Pacific Clay Products, showing part of battery of 36 kilns devoted to the making of salt-glazed sewer pipe.*

## There is No Substitute for Vitrified Salt Glazed Sewer Pipe

**N**O OTHER material is the equal of *vitrified salt glazed sewer pipe* for sanitary sewers. Its durability and general superiority are so outstanding that both theory and actual practice unite in directing its selection, in preference to any substitute, if a lasting sewer is desired. Corroding soils and sewer gases cannot attack vitrified salt glazed sewer pipe. As much may not be said for cheaper substitutes. The usual argument in favor of other materials is based on the saving in price, but clay pipe is worth more than the small additional cost in view of its assured longer life under all conditions. This is why most engineers, figuring not *first* cost but *final* cost, specify it.

A visit to the Los Nietos Plant of Pacific Clay Products—the largest sewer pipe plant on the Pacific Coast—is enlightening. One cannot but recognize the meticulous care and the assured technique exercised throughout the manufacturing process. Permanence and perfect efficiency in handling sewage are built into its products with unvarying certainty. Hundreds of engineers and contractors specializing in sewer construction have found such visits both interesting and instructive,

and a brief description of the plant and its processes is therefore given here.

The clays used come from Pacific's own clay mines in Riverside, Orange and San Diego Counties. They are shipped in self-dumping, gondola cars and unloaded into classified storage bins. The different clays are blended in proper proportions for different sizes of pipe, ground, coarse-screened and conveyed to the fine screens for final sizing, a vital detail.

The clay passes from the sizing screens to storage bins and is conveyed to "wet pans" as required. Here the requisite quantity of water is added and the clay "tempered", that is, worked into a plastic mass as the pan revolves under heavy steel-shod wheels or mullers. When the proper consistency is attained a workman scoops up the material with a suspended shovel and dumps it on to a conveyor belt which carries it to the clay cylinders of the massive sewer pipe presses.

Through these, under a pressure of 25 tons, the clay is formed into a sewer pipe. So powerful and yet so sensitive and adaptable are these presses that by use of the proper dies all sizes of sewer pipe are made on any one





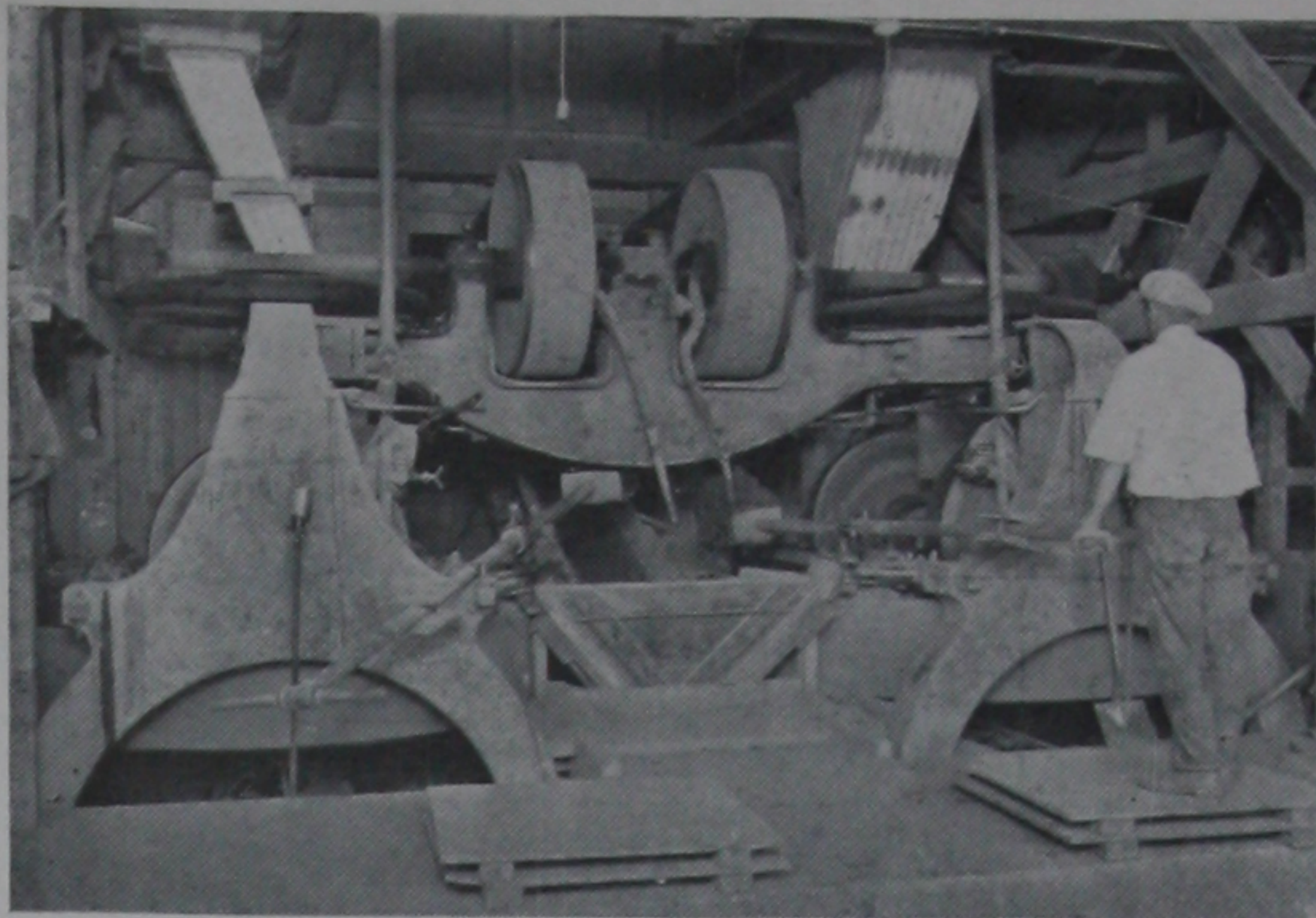
of the three in service. The capacity of each press for a day's run in the various standard sizes of pipe is approximately:

- 16,000 feet of 4-inch pipe
- 14,000 feet of 6-inch pipe
- 9,000 feet of 8-inch pipe
- 1,500 feet of 24-inch pipe
- 750 feet of 30-inch pipe

From the presses the pipe goes to the drying floor covering nearly five acres where it remains until sufficiently dry and hard to burn. The natural moisture-absorbing properties of the dry California atmosphere are utilized to good advantage, but the drying is accelerated and controlled by two sets of steam heating pipes, one underneath the slatted floor, and the other suspended from the ceiling. Great care must be exercised during the drying period to maintain even and suitable temperatures. Failure to do this might easily result in warping or cracking thousands of tons of ware.

The dry pipe is set in circular kilns 30 to 34 feet in diameter. Various sizes are combined to afford maximum loading and yet allow free circulation of heat around and through the pipe during burning. When the loading is completed, doors and other openings are tightly sealed and the kilns fired—very slowly at first while the moisture and chemically combined water are being driven off, then more rapidly to a maximum temperature of about 2200 degrees Fahrenheit.

Glazing is done by shovelling common rock salt into the fire boxes at the end of the burn. Under the intense heat the salt vaporizes, its fumes fill the kiln, and in contact with the sewer pipe decompose, unite with free silica and other substances in the clay to form a glaze over the entire surface of the pipe. Meanwhile the body of the pipe has vitrified under the heat. The vitrified body and glazed



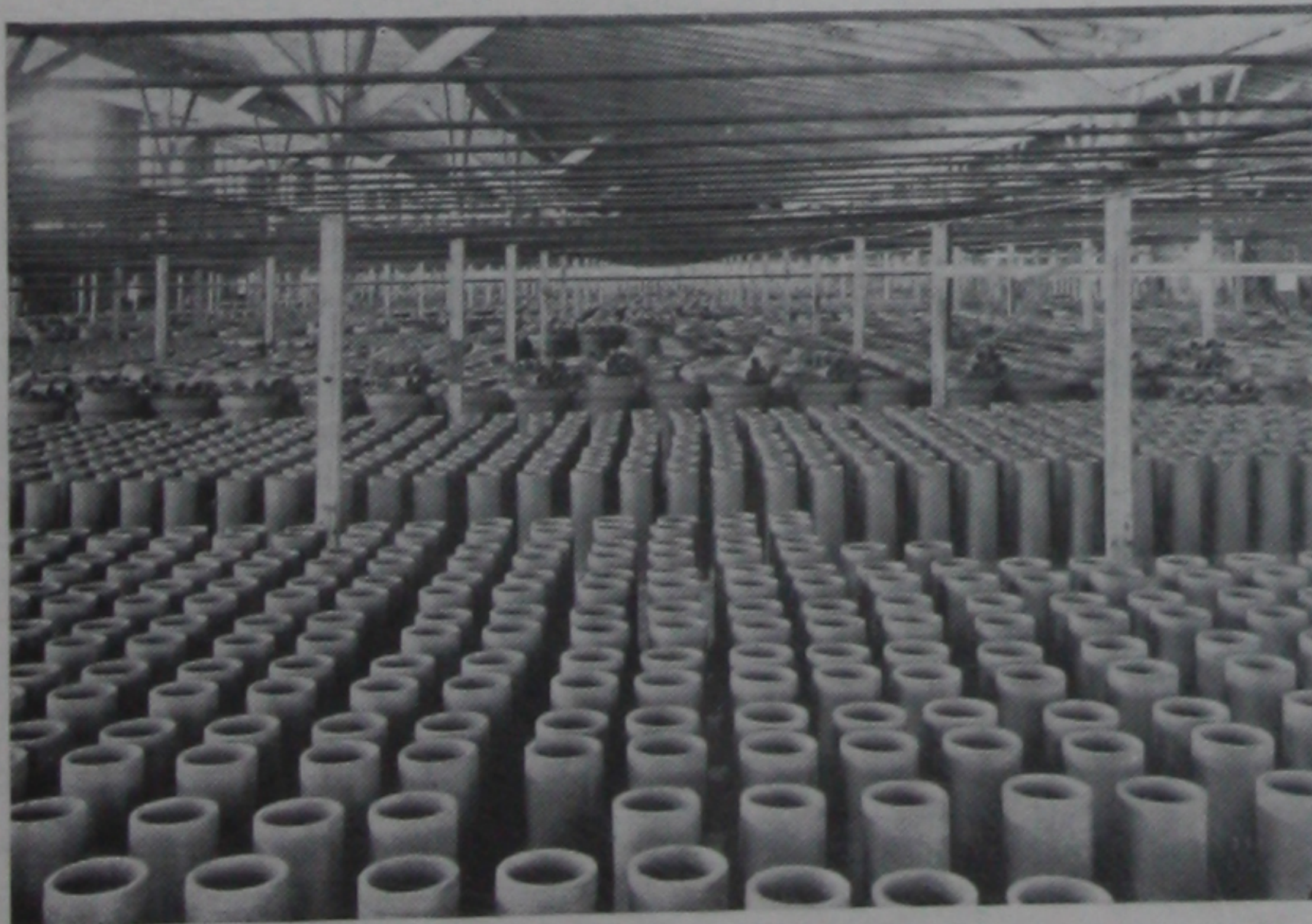
*Wet pan tempering the clay.*

surface give to clay pipe a combination of strength, impermeability, resistance to chemical attack, and maximum flow capacity unequalled by any other material. After glazing is completed the cooling is regulated so as to anneal the pipe properly. As much as twelve days is required for the entire burning and cooling cycle.

There are three complete manufacturing units of the Los Nietos Plant comprising several acres under one roof, and many more devoted to sorting and storing the company's enormous reserve stocks of pipe. The plant buildings, kilns and storage yards are situated upon a forty-six acre tract advantageously located for rail and truck delivery to any part of Southern California. Material at the plant is handled by gasoline industrial tractors with trailers. A complete testing laboratory is maintained where pipe coming from the kilns is rigidly tested to insure its conformity to the required standards and specifications.

The company's other sewer pipe plant is located upon a six-acre tract at Slauson and McKinley Avenues. The combined capacity of the two plants gives to Pacific Clay Products a total annual output upwards of 60,000 tons of sewer pipe and other vitrified salt-glazed material.

The plants now owned by Pacific Clay Products have for more than forty years been manufacturing vitrified clay pipe for Southern California sewers. Wherever it has been laid the sewers are still in service, except where they have been replaced with larger lines. In making such replacements "Pacific" pipe taken out, after thirty years of service, is found as good as new. Double such a period would still find it unchanged, for its vitrified body is among the most inert and unattackable of substances. A sewer system constructed of Pacific Vitrified Pipe is a sewer system of assured permanence.



*40,000 pieces of pipe drying.*





# PACIFIC COAST PRICE LIST

## STANDARD STRENGTH PIPE

Inside Diameter Inches	Pipe Per Foot	Y & T Branches, each		¼ Curves and Elbows Each	⅛ Curves, Reducers, Increases, Slants, Each	H.H. Traps P & S Traps Each	Stoppers, Each	Split or Channel Pipe Per Foot	Weight per Foot Approx. Lbs.
		2 Ft. Long	2½ Ft. Long						
3	\$0 25	\$1 00		\$1 00	\$ 1 00	\$2 50	\$0 06	\$0 19	7
4	25	1 00		1 00	1 00	2 50	06	19	9
5	30	1 20		1 20	1 20	3 00	07	23	14
6	35	1 40		1 40	1 40	3 50	08	27	16
8	50		\$2 25	2 00	2 00	6 00	25	38	22
10	70		3 15	2 80	2 80	8 40	35	53	31
12	90		4 05	3 60	3 60		45	68	42
14	1 10		4 95	4 40	4 40		55	83	55
15	1 30		5 85	10 40	5 20		70	98	58
*16	1 40		6 30	11 20	5 60		80	1 05	65
*18	1 70		7 65	13 60	6 80		1 00	1 28	86
*20	2 00		9 00	16 00	8 00		2 00	1 50	106
*22	2 65		11 90	21 20	10 60		2 50	2 00	112
*24	3 00		13 50	24 00	12 00		3 00	2 25	132

Double Y's and T's, and Branches with inlets 15 inches and larger, add 50% to list prices of Branches. Three to six-inch Pipe and Y and T Branches are 2 feet long; Pipe and Y and T Branches of all other diameters are 2½ feet long.

\*Owing to decreased demand we have discontinued making 16, 18, 20, 22 and 24-inch Standard Strength Pipe. However, we shall be glad to quote discounts on any of these sizes which we may have in stock, or will manufacture on order.

## DOUBLE STRENGTH PIPE

Inside Diameter, Inches	Pipe, Per Foot	Y & T Branches 2½ Ft. Long, Each	¼ Curves and Elbows, Each	⅛ Curves, Reducers, Increases, Each	Split or Channel Pipe, Per Foot	Weight, per Foot Approx. Lbs.	Feet to Carload Approx.
15	\$1 50	\$ 6 75	\$12 00	\$ 6 00	\$1 13	70	370—13 tons
18	2 10	9 45	16 80	8 40	1 58	98	204—10 "
21	2 80	12 60	22 40	11 20	2 10	134	150—10 "
24	3 60	16 20	28 80	14 40	2 70	174	115—10 "
27	5 00	22 50	40 00	20 00	3 75	224	90—10 "
30	6 00	27 00	48 00	24 00	4 50	286	70—10 "
33	8 00	36 00	64 00	32 00		340	60—10 "
36	9 00	40 50				390	51—10 "

Add 50% to list price of branches with inlets 15 inches and larger.

Double Strength Vitriified Clay Pipe is made with walls one-twelfth the diameter of the pipe and is especially desirable for culverts under railroads, highways and other uses where the pipe is required to sustain impact or heavy loads.





# Vitrified Salt Glazed Pipe

## STANDARD SHAPES



STRAIGHT PIPE



Y BRANCH



T BRANCH



DOUBLE T



DOUBLE Y



SADDLE



$\frac{1}{4}$  OR 90% CURVE



$\frac{1}{8}$  OR 45% CURVE



INCREASER



ONE-FOOT LENGTH



SLANT



S TRAP



REDUCER



HAND HOLE TRAP



SPLIT PIPE



GREASE TRAP

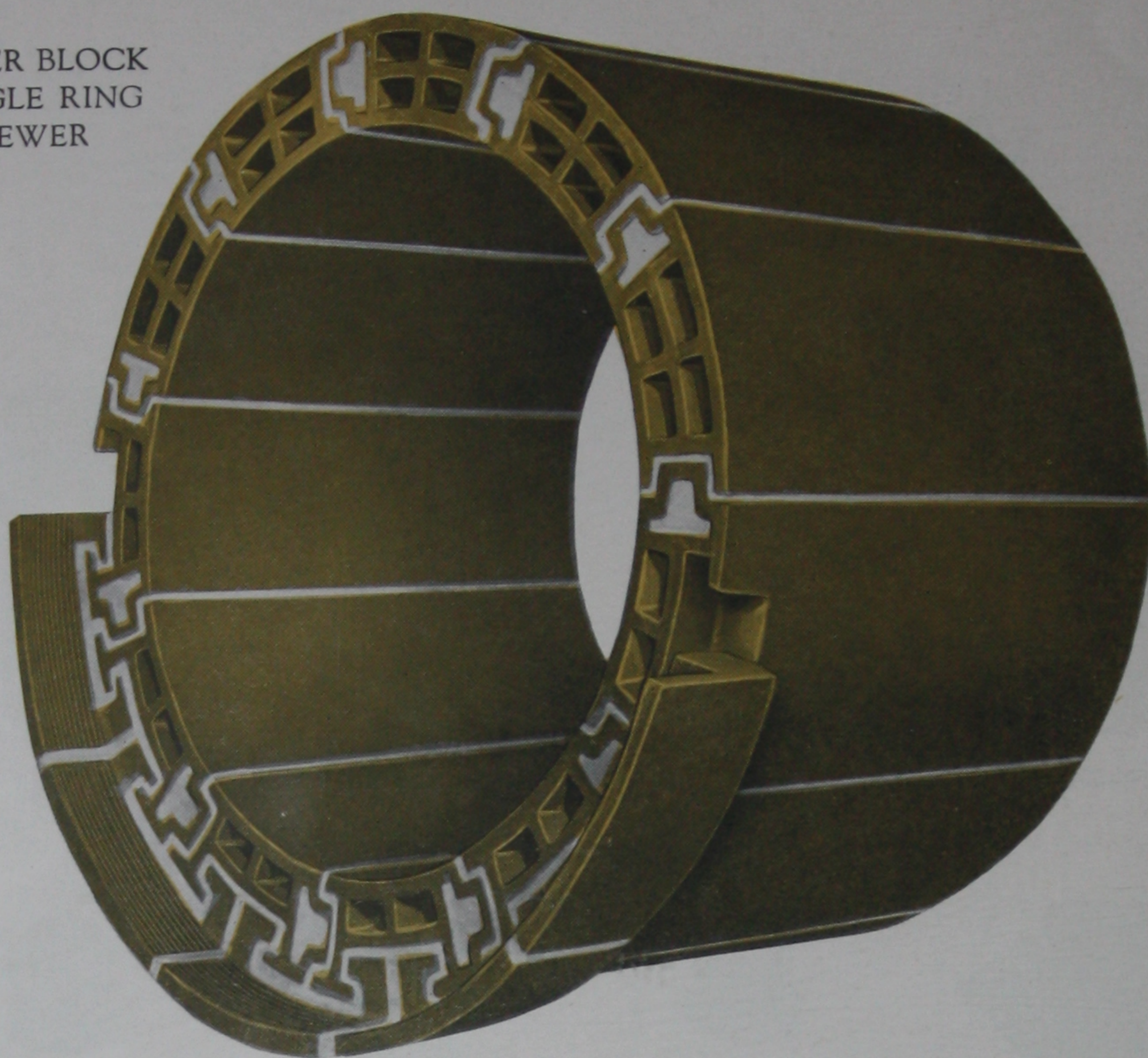


P TRAP





MEIER BLOCK  
SINGLE RING  
SEWER



## Segmental Sewer Blocks

*for Large Sewer Construction*



Ferguson Block Double Ring Sewer

Vitrified clay pipe is made in stock sizes up to 33" in diameter and for requirements of larger size segmental blocks are recommended. From these any desired diameter of sewer can be made. These blocks are available in two types—the Meier Block, a single ring block which is made up into three-foot lengths of pipe in advance of laying; and the Ferguson Block, which consists of an outside shell with lining blocks inside, and which is built up on the job.

The company also makes clay lining blocks for monolithic sewers and large reinforced concrete pipe. These liners serve as a protection to the cement pipe against attack by sewer gases.

Segmental blocks and liners are furnished only on special construction contracts and prices will be furnished on application.





## Velocity and Discharge in Sewers 4 to 18" Diameter, of Vitrified Pipe

(from "Sewerage" by A. Prescott Folwell)

Velocity in Feet per Second; Discharge in Cubic Feet per Minute; Sewers Flowing Full

Grade of Sewer	4-inch		6-inch		8-inch		10-inch		12-inch		15-inch		18-inch	
	V	Q	V	Q	V	Q	V	Q	V	Q	V	Q	V	Q
.1	5.75	30.13	7.99	94.10	10.04	210.3	11.94	390.8	13.73	647.0	16.24	1196.0	18.59	1971.5
.05	4.06	21.28	5.64	66.48	7.09	148.6	8.43	276.1	9.70	457.1	11.48	845.0	13.13	1393.0
.04	3.63	19.03	5.05	59.45	6.34	132.9	7.54	246.9	8.65	407.8	10.26	755.6	11.74	1244.0
.03	3.15	16.47	4.35	51.25	5.49	115.0	6.53	213.7	7.51	353.9	8.89	654.4	10.17	1078.0
.02	2.57	13.44	3.56	42.00	4.48	93.90	5.33	174.5	6.13	289.0	7.25	534.2	8.30	880.4
.01	1.82	9.50	2.52	29.70	3.17	66.38	3.77	123.4	4.33	204.3	5.13	377.8	5.87	622.6
.008	1.61	8.37	2.25	26.53	2.83	59.35	3.37	110.3	3.87	182.6	4.59	337.7	5.25	556.8
.006	1.38	7.18	1.95	23.00	2.45	51.39	2.92	95.55	3.35	158.2	3.97	292.5	4.55	482.3
.004			1.59	18.71	2.00	41.85	2.38	77.98	2.74	129.1	3.24	238.3	3.70	392.9
.002					1.40	29.38	1.67	54.61	1.91	90.40	2.27	167.3	2.60	275.9
.001							1.17	38.41	1.35	63.58	1.60	117.7	1.83	194.3
.0009											1.51	111.4	1.73	183.9
.0008													1.63	173.1
.0007													1.52	161.2

## Velocity and Discharge in Sewers 20 to 36" Diameter, of Vitrified Pipe

Velocity in Feet per Second; Discharge in Cubic Feet per Minute; Sewers Flowing Full.

Grade of Sewer	20-inch		22-inch		24-inch		30-inch		33-inch		36-inch	
	V	Q	V	Q	V	Q	V	Q	V	Q	V	Q
.1	20.08	2628	21.51	3407	22.91	4319	26.84	7905	28.69	10220	30.46	12920
.05	14.18	1857	15.20	2407	16.19	3052	18.97	5586	20.27	7225	21.54	9136
.04	12.69	1661	13.59	2153	14.47	2729	16.96	4995	18.13	6461	19.26	8171
.03	10.98	1438	11.77	1864	12.53	2363	14.69	4325	15.70	5595	16.68	7075
.02	8.97	1174	9.61	1522	10.23	1930	11.99	3532	12.82	4568	13.62	5777
.01	6.34	830	6.79	1076	7.24	1366	8.48	2497	9.06	3230	9.63	4085
.008	5.67	742	6.07	962	6.47	1210	7.58	2233	8.11	2889	8.61	3653
.006	4.91	643	5.26	833	5.60	1057	6.57	1934	7.02	2502	7.46	3164
.004	4.00	524	4.29	679	4.56	860	5.35	1576	5.72	2040	6.08	2580
.002	2.81	368	3.01	477	3.21	605	3.76	1109	4.02	1434	4.28	1814
.001	1.98	259	2.12	336	2.26	427	2.66	782	2.84	1012	3.02	1281
.0009	1.87	245	2.01	318	2.14	404	2.51	741	2.69	959	2.86	1213
.0008	1.76	231	1.89	299	2.02	380	2.37	697	2.53	902	2.69	1141
.0007	1.64	215	1.76	279	1.88	354	2.20	650	2.36	841	2.51	1065
.0006	1.51	198	1.63	258	1.73	327	2.04	600	2.18	777	2.32	984
.0005			1.48	234	1.58	298	1.86	546	1.99	708	2.11	896
.0004			1.32	208	1.40	265	1.65	486	1.77	630	1.88	798
.0003					1.20	227	1.40	413	1.52	541	1.62	686
.0002					.98	186	1.13	335	1.22	435	1.30	555

(Formula  $V = c\sqrt{RS}$ ;  $c$ —calculated by Kutter's formula, with  $n = .013$ .  $Q = 60aV$ ).

For  $n = .011$  .012 .013 .015 .017

Multiply  $V$  or  $Q$  by 1.20 1.09 1.00 0.84 0.73

1 gallon per day = .00009284 cubic foot per minute.

1 cubic foot per minute = 10,771 gallons per day.

Multiply  $Q$  by 7.48 for gallons per minute discharge.

Conditions governing the size of a sewer at any point are as follows:

1. The amount of sewage proper passing that point.

2. The amount of rainfall passing through the sewer at that point at a given time.

(This applies when the system is constructed to carry both sewage and the rainfall.)

3. The inclination of the sewer. If a sewer is made unnecessarily large, the depth and velocity of the sewage passing through it are proportionately reduced, and its ability to keep itself clear will be confined to high rates of inclination. It is important, therefore, to have the sewer as small as the service to be required of it will admit.





# APPROXIMATE WEIGHTS AND DIMENSIONS

## STANDARD STRENGTH PIPE

Inside Diameter Inches	Weight Per Ft. Pounds	Feet to Ton	Feet to Carload Approximate	Length Feet	Thickness Inches	Depth Socket Inches	Annular Space Inches	Area Square Inches
3	7	290	3715—13 tons	2	$\frac{1}{2}$	$1\frac{3}{8}$	$\frac{1}{4}$	7
4	9	220	3058—13 "	2	$\frac{1}{2}$	$1\frac{1}{2}$	$\frac{3}{8}$	$12\frac{1}{2}$
5	14	143	1857—13 "	2	$\frac{5}{8}$	$1\frac{3}{4}$	$\frac{3}{8}$	$19\frac{1}{2}$
6	16	125	1625—13 "	2	$\frac{3}{4}$	$1\frac{7}{8}$	$\frac{3}{8}$	$28\frac{1}{4}$
8	22	91	1180—13 "	$2\frac{1}{2}$	$\frac{7}{8}$	$2\frac{1}{4}$	$\frac{3}{8}$	$50\frac{1}{4}$
10	31	65	840—13 "	$2\frac{1}{2}$	$\frac{7}{8}$	$2\frac{3}{8}$	$\frac{3}{8}$	$78\frac{1}{2}$
12	42	48	620—13 "	$2\frac{1}{2}$	1	$2\frac{1}{2}$	$\frac{1}{2}$	113
14	55	36	475—13 "	$2\frac{1}{2}$	$1\frac{1}{16}$	$2\frac{3}{4}$	$\frac{1}{2}$	154
15	58	34	450—13 "	$2\frac{1}{2}$	$1\frac{1}{8}$	$2\frac{3}{4}$	$\frac{1}{2}$	177
16	65	31	400—13 "	$2\frac{1}{2}$	$1\frac{3}{16}$	3	$\frac{1}{2}$	201
18	86	23	235—10 "	$2\frac{1}{2}$	$1\frac{5}{16}$	$2\frac{7}{8}$	$\frac{1}{2}$	254
20	106	19	190—10 "	$2\frac{1}{2}$	$1\frac{1}{2}$	3	$\frac{1}{2}$	314
22	112	18	180—10 "	$2\frac{1}{2}$	$1\frac{5}{8}$	$3\frac{1}{4}$	$\frac{1}{2}$	380
24	132	15	150—10 "	$2\frac{1}{2}$	$1\frac{3}{4}$	$3\frac{3}{8}$	$\frac{1}{2}$	452

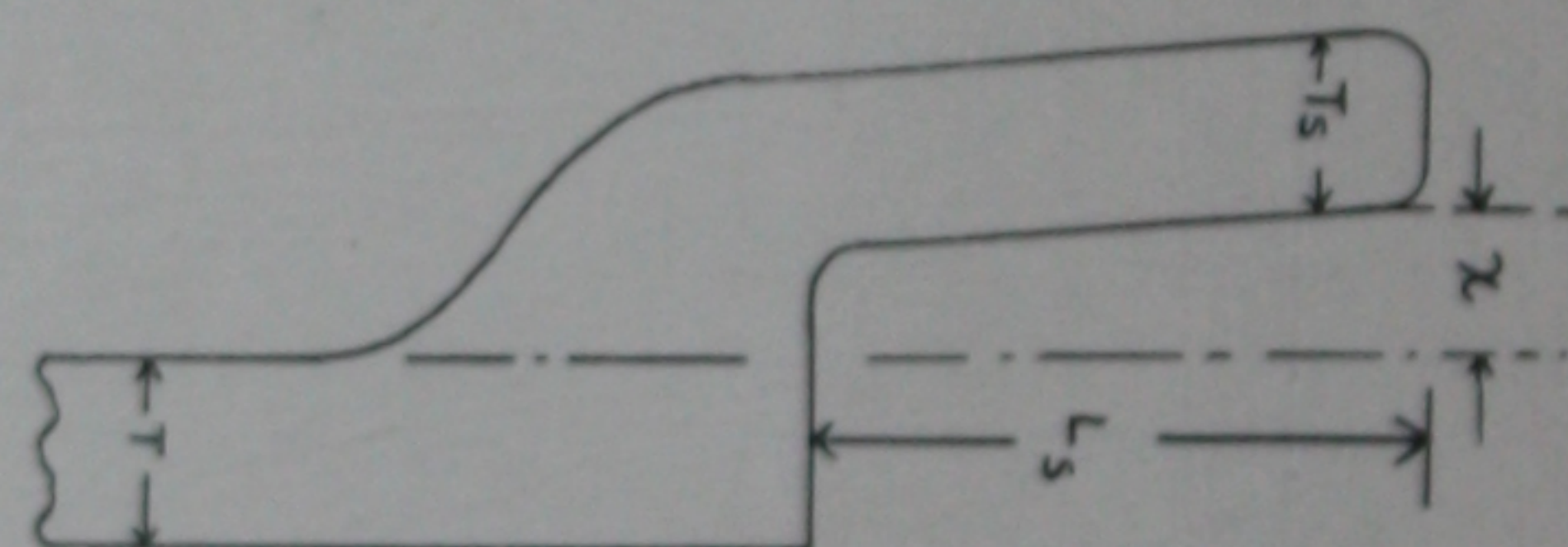
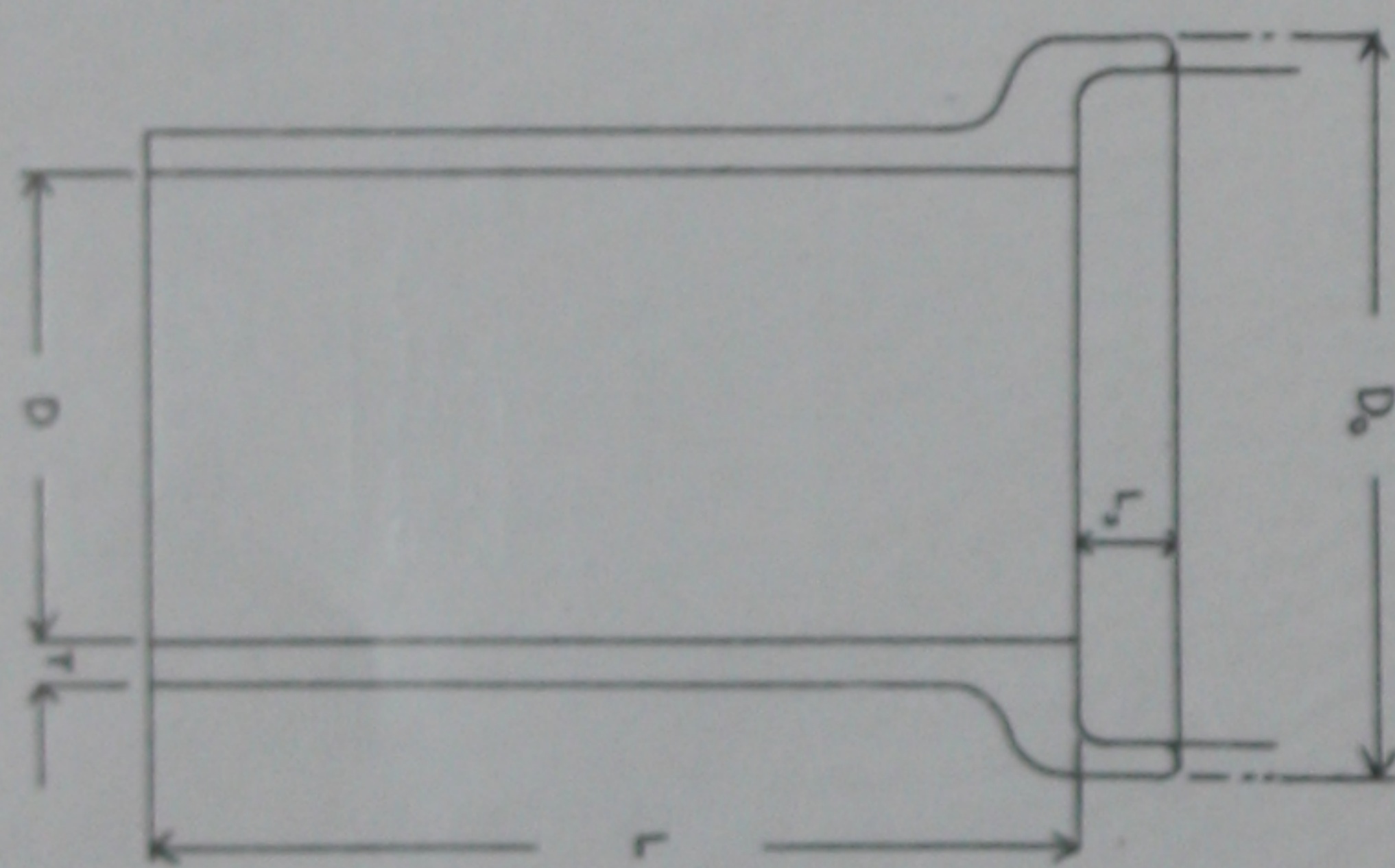
Eight inch pipe is also furnished in three foot lengths.

## DOUBLE STRENGTH PIPE

Inside Diameter Inches	Weight Per Ft. Pounds	Feet to Ton	Feet to Carload Approximate	Length Feet	Thickness Inches	Depth Socket Inches	Annular Space Inches	Area Square Inches
15	70	29	370—13 tons	$2\frac{1}{2}$	$1\frac{1}{4}$	$2\frac{1}{2}$	$\frac{1}{2}$	177
18	98	20	204—10 "	$2\frac{1}{2}$	$1\frac{1}{2}$	$2\frac{3}{4}$	$\frac{1}{2}$	254
21	134	15	150—10 "	$2\frac{1}{2}$	$1\frac{3}{4}$	3	$\frac{1}{2}$	346
24	174	11	115—10 "	$2\frac{1}{2}$	2	$3\frac{1}{4}$	$\frac{1}{2}$	452
27	224	9	90—10 "	$2\frac{1}{2}$	$2\frac{1}{4}$	4	$\frac{3}{4}$	573
30	286	7	70—10 "	$2\frac{1}{2}$	$2\frac{1}{2}$	4	$\frac{3}{4}$	707
33	340	6	60—10 "	3	$2\frac{5}{8}$	4	$\frac{7}{8}$	855
36	390	5	51—10 "	3	$2\frac{3}{4}$	4	1	1018

## TABLE OF APPROXIMATE DIMENSIONS

### PACIFIC CLAY SEWER PIPE



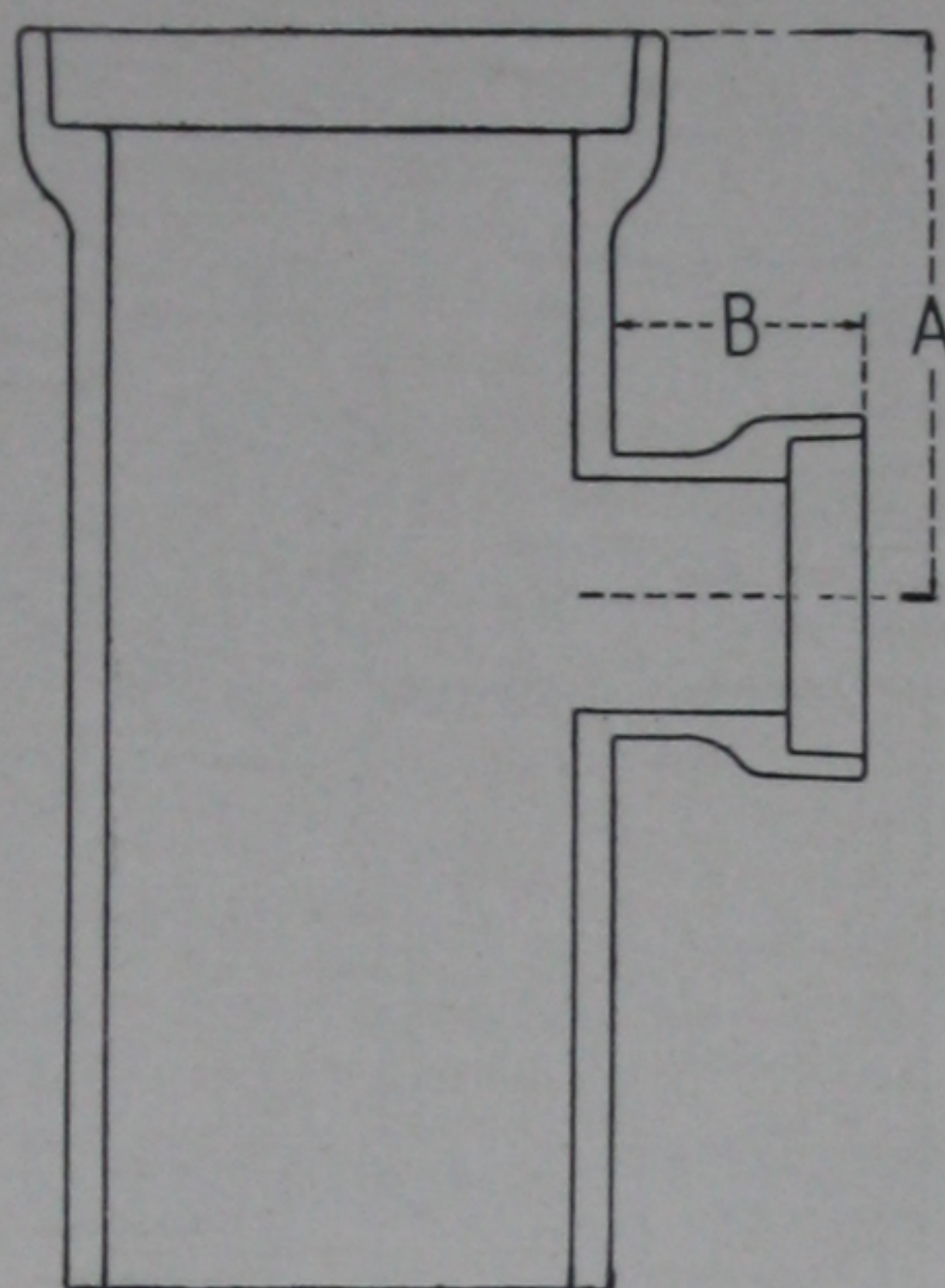
#### Note

Variation for the above dimensions of true circle of  $3\frac{1}{2}$  per cent are to be expected. Measurements are approximate.

Inside Diameter Inches	Approx. Weight per Foot	Approx. Footage per Carload	Laying Length Feet (L-inches)	Depth of Socket (Ls-inches)	Thickness of Socket (Ts-inches)	Annular Space Inches (X-inches)	Outside Diameter Socket, Inches (Do-inches)	Thickness Barrel, Inches (T-inches)
4	9	3058—13 tons	2	2	$\frac{3}{8}$	$\frac{3}{8}$	$6\frac{5}{8}$	$\frac{1}{2}$
6	16	1625—13 "	$2-2\frac{1}{2}$	$2\frac{1}{8}-2\frac{1}{2}$	$\frac{7}{16}$	$\frac{3}{8}-\frac{5}{8}$	$9\frac{3}{4}$	$\frac{3}{4}$
8	22	1180—13 "	$2\frac{1}{2}$	$2\frac{5}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$11\frac{3}{4}$	$\frac{3}{4}$
10	31	840—13 "	$2\frac{1}{2}$	$2\frac{5}{8}$	$\frac{9}{16}$	$\frac{5}{8}$	$14\frac{1}{8}$	$\frac{7}{8}$
12	42	620—13 "	$2\frac{1}{2}$	$2\frac{7}{8}$	$\frac{3}{4}$	$\frac{5}{8}$	$17\frac{1}{2}$	1
15	58	450—13 "	$2\frac{1}{2}$	$2\frac{7}{8}$	$1\frac{5}{16}$	$\frac{5}{8}$	$20\frac{1}{4}$	$1\frac{1}{8}$
18	98	204—10 tons	$2\frac{1}{2}$	$3\frac{1}{8}$	1	$\frac{5}{8}$	$24\frac{3}{8}$	$1\frac{1}{2}$
21	134	150—10 "	$2\frac{1}{2}$	$3\frac{5}{8}$	$1\frac{1}{16}$	$\frac{3}{4}$	$28\frac{5}{8}$	$1\frac{3}{4}$
24	174	115—10 "	$2\frac{1}{2}$	$3\frac{7}{8}$	$1\frac{3}{8}$	$\frac{3}{4}$	$32\frac{3}{4}$	2
27	224	90—10 "	$2\frac{1}{2}$	$3\frac{7}{8}$	$1\frac{5}{8}$	$\frac{7}{8}$	$37\frac{1}{4}$	$2\frac{1}{4}$
30	286	70—10 "	$2\frac{1}{2}$	$3\frac{7}{8}$	$1\frac{7}{8}$	$\frac{7}{8}$	41	$2\frac{1}{2}$
33	340	58—10 "	3	$3\frac{7}{8}$	2	$\frac{7}{8}$	$44\frac{3}{8}$	$2\frac{5}{8}$
36	390	51—10 "	3	$3\frac{7}{8}$	2	1	48	$2\frac{3}{4}$







**Note**

Dimensions A and B are approximate.

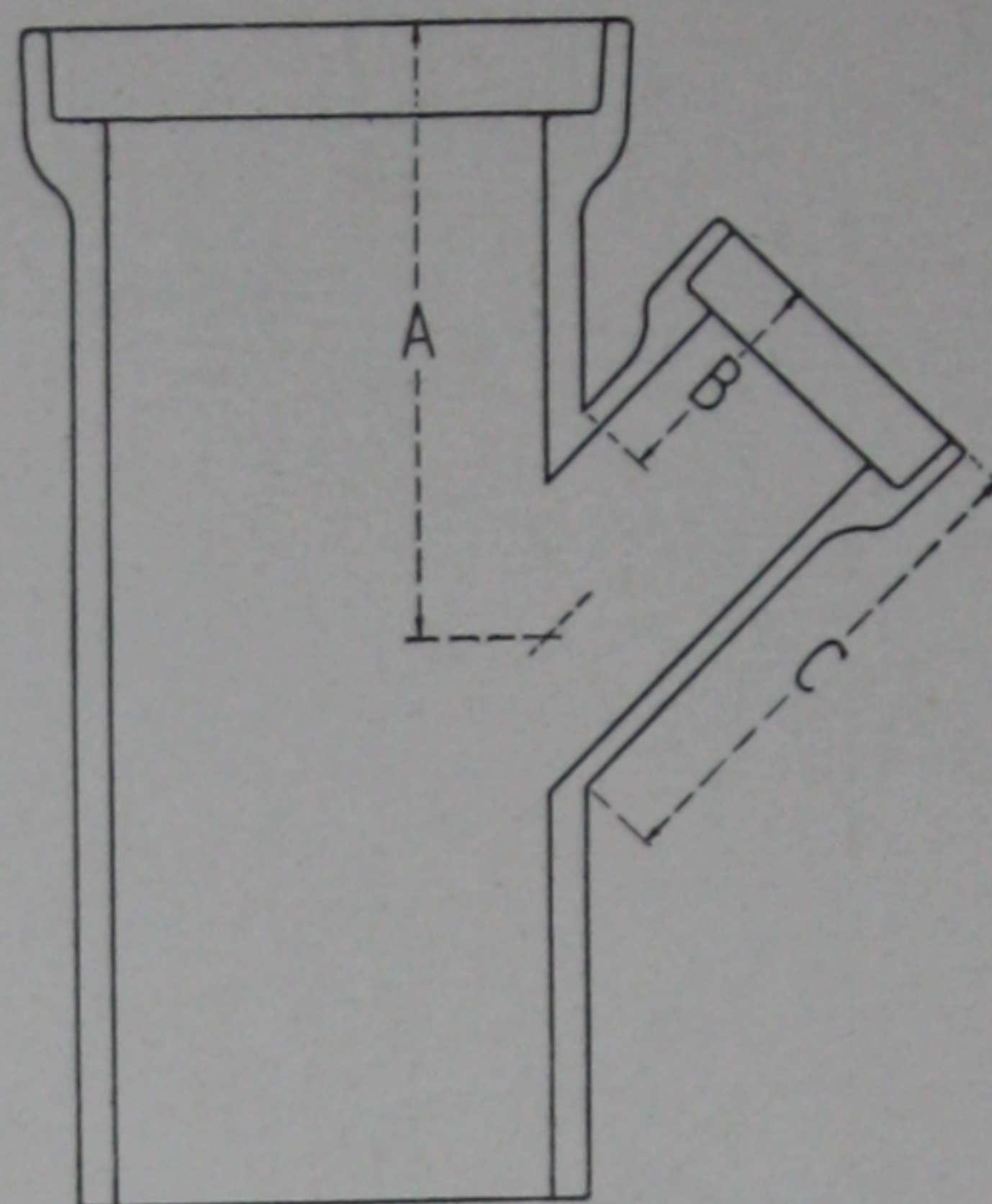
**APPROXIMATE DIMENSIONS "T" BRANCHES**

Furnished in Same Lengths as Pipe.

Barrel Diameter Inches	Spur Diameter Inches	A Inches	B Inches	Barrel Diameter Inches	Spur Diameter Inches	A Inches	B Inches
4	4	10	5	24	6	16	6
6	4	10	5	24	8	17	7
6	6	12	6	24	10	18	7
8	4	11	5	24	12	19	8
8	6	12	6	24	15	20	8
8	8	13	7	27	6	16	6
10	4	11	5	27	8	17	7
10	6	12	6	27	10	18	7
10	8	13	7	27	12	19	8
10	10	14	7	27	15	20	8
12	4	11	5	30	6	17	6
12	6	12	6	30	8	18	7
12	8	13	7	30	10	19	7
12	10	14	7	30	12	20	8
12	12	17	8	30	15	21	8
15	6	12	6	33	6	18	6
15	8	13	7	33	8	19	7
15	10	14	7	33	10	20	7
15	12	15	8	33	12	21	8
18	6	15	6	33	15	22	8
18	8	16	7	36	6	18	6
18	10	17	7	36	8	19	7
18	12	18	8	36	10	20	7
21	6	15	6	36	12	21	8
21	8	16	7	36	15	22	8
21	10	17	7				
21	12	18	8				
21	15	19	8				







**Note**

Dimensions A, B and C are approximate.

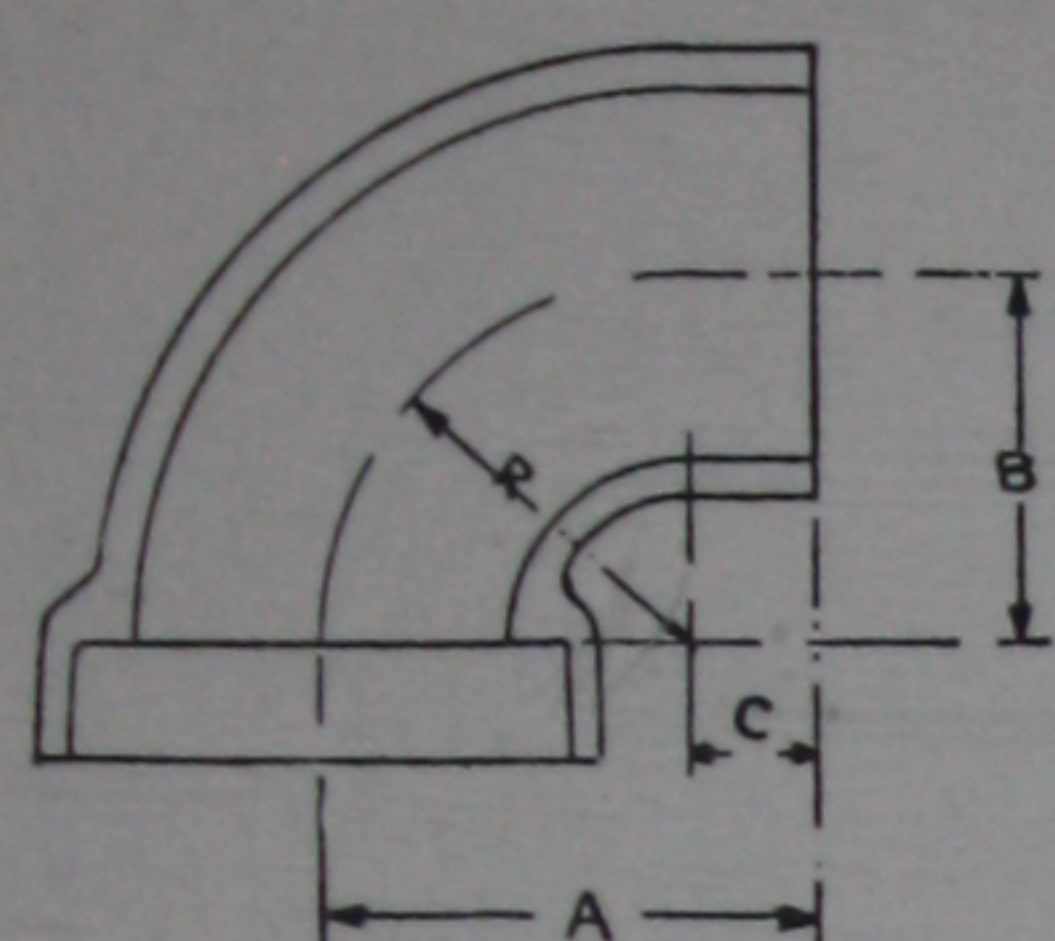
**APPROXIMATE DIMENSIONS "Y" BRANCHES**

**Furnished in Same Lengths as Pipe.**

Barrel Diameter Inches	Spur Diameter Inches	A Inches	B Inches	C Inches	Barrel Diameter Inches	Spur Diameter Inches	A Inches	B Inches	C Inches
4	4	8	5	10	24	6	15	6	11
6	4	9	5	10	24	8	17	7	12
6	6	10	6	11	24	10	18	7	14
8	4	9	5	10	24	12	20	8	16
8	6	10	6	11	24	15	22	8	18
8	8	12	7	12	27	6	16	6	11
10	4	10	5	10	27	8	18	7	12
10	6	11	6	11	27	10	19	7	14
10	8	13	7	12	27	12	21	8	16
10	10	14	7	14	27	15	23	8	18
12	4	10	5	10	30	6	16	6	11
12	6	11	6	11	30	8	18	7	12
12	8	13	7	12	30	10	19	7	14
12	10	14	7	14	30	12	21	8	16
12	12	16	8	16	30	15	23	8	18
15	6	12	6	11	33	6	17	6	11
15	8	14	7	12	33	8	19	7	12
15	10	15	7	14	33	10	20	7	14
15	12	17	8	16	33	12	22	8	16
18	6	14	6	11	33	15	24	8	18
18	8	16	7	12	36	6	17	6	11
18	10	17	7	14	36	8	19	7	12
18	12	19	8	16	36	10	20	7	14
21	6	15	6	11	36	12	22	8	16
21	8	17	7	12	36	15	24	8	18
21	10	18	7	14					
21	12	20	8	16					
21	15	22	8	18					





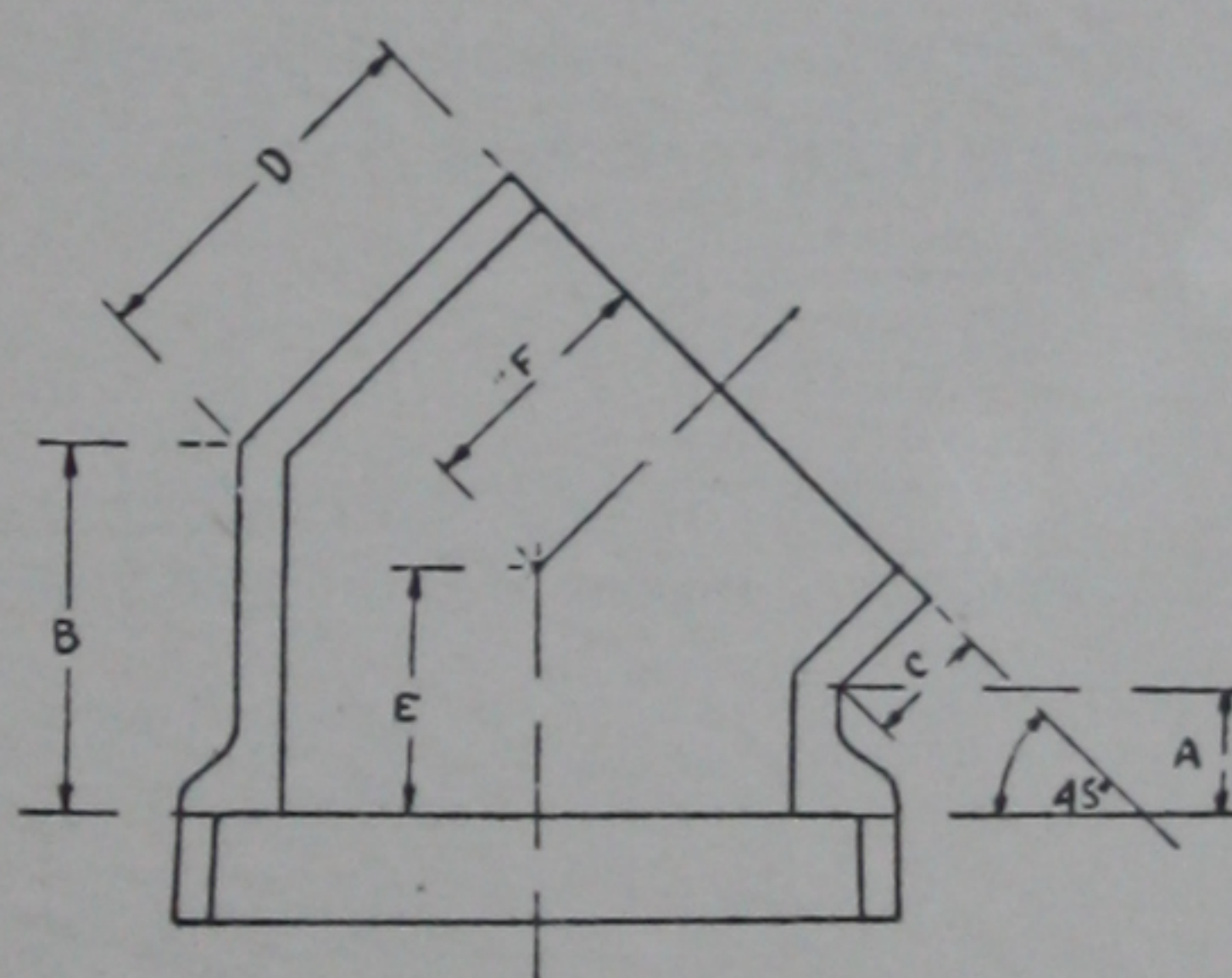
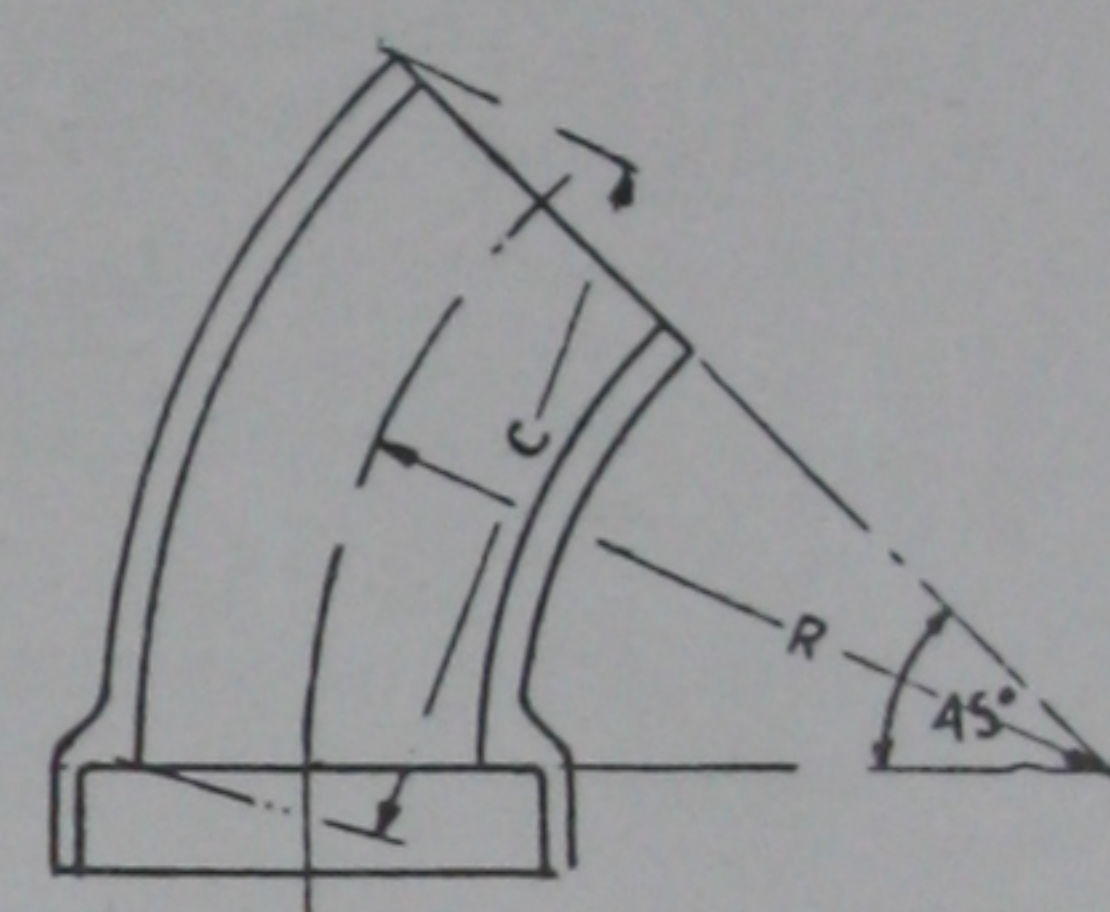


### APPROXIMATE DIMENSIONS 1/4 BENDS

Diameter Inches	A Inches + -1/2"	B Inches + -1/2"	C Inches + -1/2"	R Inches + -1/2"
4	6	4 1/2	1 1/2	4 1/2
6	7 1/2	6	1 1/2	6
8	10	8	2	8

### APPROXIMATE DIMENSIONS 1/8 BENDS

Diameter Inches	C Inches + -1/2"	R Inches + -1/2"
4	12	13 5/8
6	12	12 5/8



### APPROXIMATE DIMENSIONS 1/8 BENDS

Diameter Inches	A Inches + -1/4"	B Inches + -1/4"	C Inches + -1/4"	D Inches + -1/4"	E Inches + -1/4"	F Inches + -1/4"
8	2 1/2	6 3/8	2 3/4	6 5/8	4 1/2	4 5/8
10	2 3/4	7 5/8	3	7 7/8	5 1/8	5 1/2
12	3	8 3/4	3	8 3/4	5 7/8	5 7/8
15	3 3/8	10 5/8	3 1/2	10 3/4	7	7 1/8
18	4	12 3/4	4	12 3/4	8 3/8	8 3/8
21	4 1/2	14 1/2	4 1/2	15	9 1/2	9 1/2
24	4 3/4	16 3/8	4	15 5/8	10 1/2	9 7/8
27	5	18 1/8	4 1/2	17 5/8	11 1/2	11 1/8
30	5 3/8	19 7/8	4 1/2	19	12 5/8	11 3/4
33	5 5/8	21 1/2	5	20 7/8	13 1/2	13
36	6	23 1/8	5	22 1/8	14 1/2	13 5/8





# Directions for Laying Vitrified Salt Glazed Pipe

**EXCAVATION**—Commence at the lower end or outlet of the proposed drain or sewer and grade the trench on a uniform inclination throughout its length, cutting out special grooves for the sockets, so the pipe when laid will have firm bearing on solid ground.

**LAYING PIPE**—Commence laying the pipe at the outlet with the sockets facing up-grade.

**CEMENT MORTAR JOINTS**—Completely fill the annular space between the spigot and socket ends of the pipe with freshly mixed mortar composed of one part of cement to two parts of clean, sharp sand, free from gravel, loam or soil.

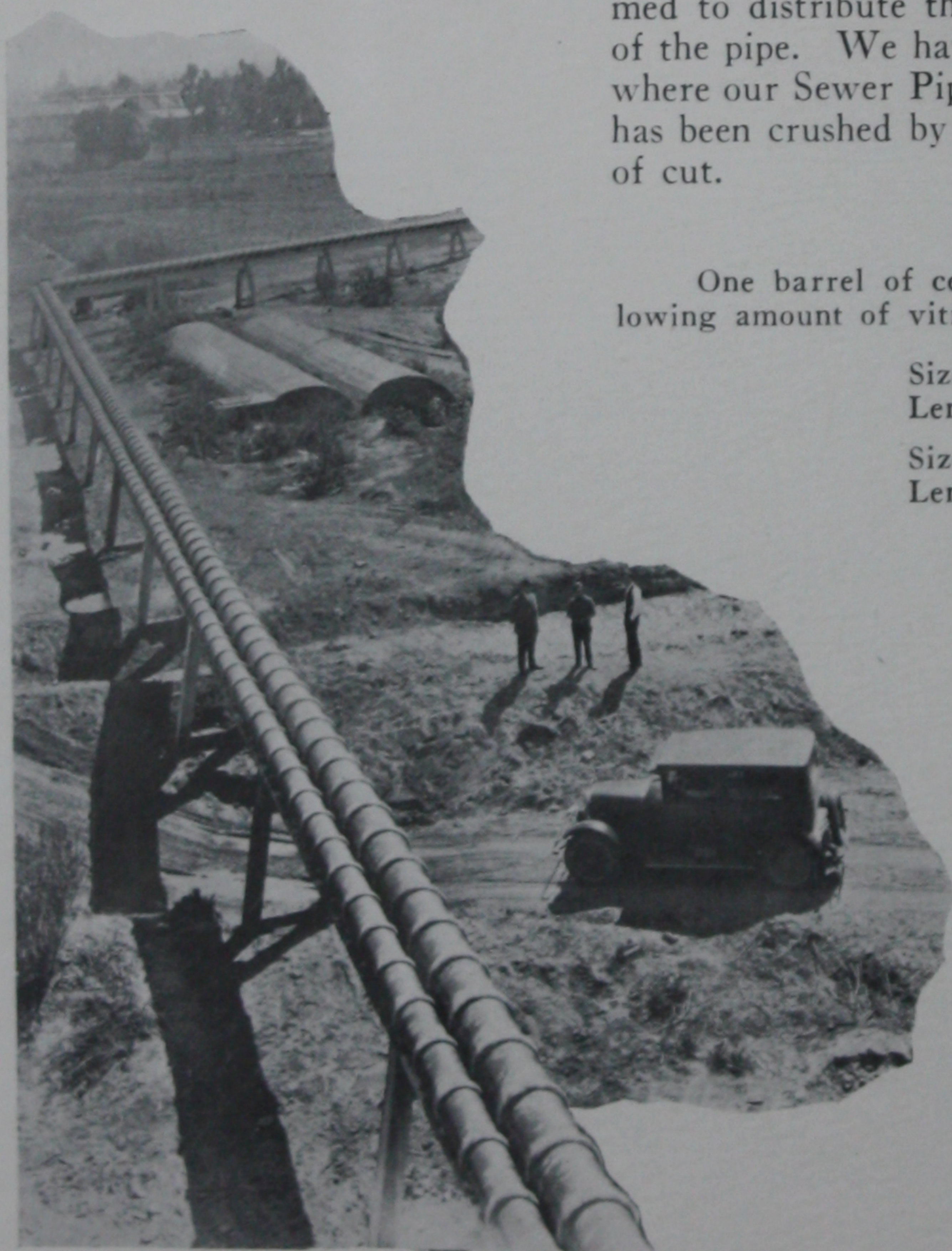
**HOT POURED JOINTS**—With the pipe in place, caulk the joint with oakum driving it home so as to leave 1½ inches between the gasket and end of the socket. Place an oiled runner around the pipe, leaving an opening in the top. Pour the hot compound into the joint and when filled let stand until the compound solidifies.

**CLEANING PIPE**—When each length has been permanently set in place, clean out the projecting mortar so as to leave a smooth interior surface.

**BACKFILL**—The sides should be carefully rammed to distribute the pressure over the entire surface of the pipe. We have never heard of a single instance where our Sewer Pipe, when properly laid and bedded, has been crushed by the weight of filling in any depth of cut.

One barrel of cement will lay approximately the following amount of vitrified sewer pipe:

Size, inches.....	6	8	10	12
Length, feet.....	320	260	200	160
Size, inches.....	16	18	20	24
Length, feet.....	120	80	60	40



*Elevated lines of 12" and 18" "Pacific" vitrified clay pipe at the Corona, California, sewage treatment plant. Currie Engineering Company, Designers.*







# PACIFIC DRAIN TILE

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***Pacific Clay Products***

SUITE 650 CHAMBER  
OF COMMERCE BLDG.



1151 SO. BROADWAY  
LOS ANGELES

PACIFIC Face Brick ☐ Ornamental Brick ☐ Roof Tile ☐ Fire Brick ☐ Fire Clay ☐ Flue Lining ☐ Sewer Pipe ☐ Drain Tile ☐





Inside Diameter Inches	Pacific Coast Prices per 1000 Feet	Weight per Foot	Length in Pounds	Feet 13 Ton Carload
3	\$ 80.00	5	1	5200
4	90.00	7	1	3600
5	115.00	13	1	2000
6	150.00	15	1	1740
8	250.00	21	2	1300
10	350.00	32	2	870
12	450.00	41	2	666
14	600.00	50	2	520
16	700.00	60	2	434

**S**YSTEMATIC DRAINAGE in recent years has come to be indispensable in cultivation where irrigation methods are employed.

Irrigated lands frequently become boggy, and whether they do or not, almost without exception alkali accumulates in the soil until eventually it becomes so impregnated that nothing will grow in it. Experience has demonstrated conclusively that for permanent and successful cultivation of irrigated lands, especially where there is a tight clay sub-soil, irrigation must be accompanied by suitable under-drainage.

Judicious application of drainage has been of incalculable value to Southern California agricultural industries, both as a necessary adjunct to irrigation, and in reclaiming alkaline lands and marshy stretches near the coast. Many thousands of acres have been brought under successful cultivation which previously had been worthless.

#### WHAT DRAINAGE ACCOMPLISHES

Removal of excess water from the soil accomplishes several results which materially affect crop productivity. There is better aeration, or penetration of air into and through the soil, and air is necessary to plant life. The texture of the soil is improved and depth available for supporting plant life extended. The activity of nitro-bacteria, so important to growing plants, is stimulated. Excess alkali, which renders the soil unfit for cultivation, is removed.





## PRACTICAL BENEFITS OF DRAINAGE

With scientific irrigation and drainage there is introduced into the soil the right amount of moisture and heat. Under these conditions seeds germinate rapidly and plant growth is accelerated. Roots push to greater depth and plants are generally more hardy and vigorous. Crops are brought to maturity in minimum time, enormously increasing the yield per acre, and profits earned.

## HOW TO DRAIN

Surface drainage by open ditches is not suitable for irrigated lands, in fact, rarely efficient for any farm drainage. In connection with irrigation, under-drainage through pipe is always employed, and since such systems are designed to be permanent they should be laid of well-burned clay drain tile. Hard-burned clay tile is entirely unaffected by the alkalis and alkaline sulphates contained in the ground water which will be constantly drained off.

In drainage work too much stress cannot be put upon the importance of laying the lines at adequate depth, and the use of ample size drain tile. This makes it unnecessary to put in a large number of small lines which otherwise would be required, and keeps the soil in much better condition, due to the greater depth at which the water table is maintained.

The approximate quantity of drain tile necessary to tile one acre of ground is:

- 1000 feet if laid at distance of 40 feet apart
- 900 feet if laid at distance of 50 feet apart
- 700 feet if laid at distance of 60 feet apart

## "PACIFIC" DRAIN TILE

Competent authorities recommend that tile pipe for drainage installations be pipe made on sewer pipe presses. All "Pacific" pipe is so made, and the 25-ton pressure exerted gives to it a dense, firm, homogeneous body, amply strong to sustain any weight to which it may be subjected in ordinary use. The same skill and care devoted to sewer pipe is employed in the manufacture of drain tile, and the superior quality of "Pacific" tile has therefore for many years set the standard for the West Coast.

Those who desire to make a detailed study of drainage will be interested in Farmers' Bulletin No. 805 of the U.S. Department of Agriculture, and Bureau of Standards Technologic paper No. 307.





# Specifications *for* Installing Clay Tile Drainage

## SURVEYS

The area to be drained shall be surveyed to ascertain the slopes and location of outlet. The character and depth of soil, and maximum amount of water to be removed shall also be determined.

Stakes shall be set by the engineer showing the location of the drainage lines with depth of trench marked on each stake. The grade of the drainage lines shall be not less than 1" fall for the main line, and 2" for laterals, per 100 feet. The main line and laterals shall be laid to the greatest depth permissible for discharge into the outlet, and consistent with economical ditching.

## DIGGING TRENCHES

Trenches shall be dug starting from the outlet and continuing along the main line to its highest point. Trenches for laterals shall be dug in the same manner, starting from the main line. All trenches shall be dug to the depths as shown on the stakes and shall be graded evenly on the bottom throughout, with a groove to receive the tile, so that when laid it will remain securely in place.

## DRAIN TILE

The tile shall be "Pacific" or equal quality red drain tile. It shall be straight, well burned, and have a good ring when struck with a hammer. Sizes shall be ample to handle the maximum flow as determined by the survey, and except for stub ends and short laterals should be over 4" in diameter.

## LAYING THE TILE

Laying shall follow the trenching, beginning at the lower end and proceeding up-grade to the ends of the main and laterals. The butt joints shall be laid as closely as practicable, and in straight alignment, which will allow water seepage but prevent infiltration of silt into the line. Junctions with branch lines shall be carefully and securely made.

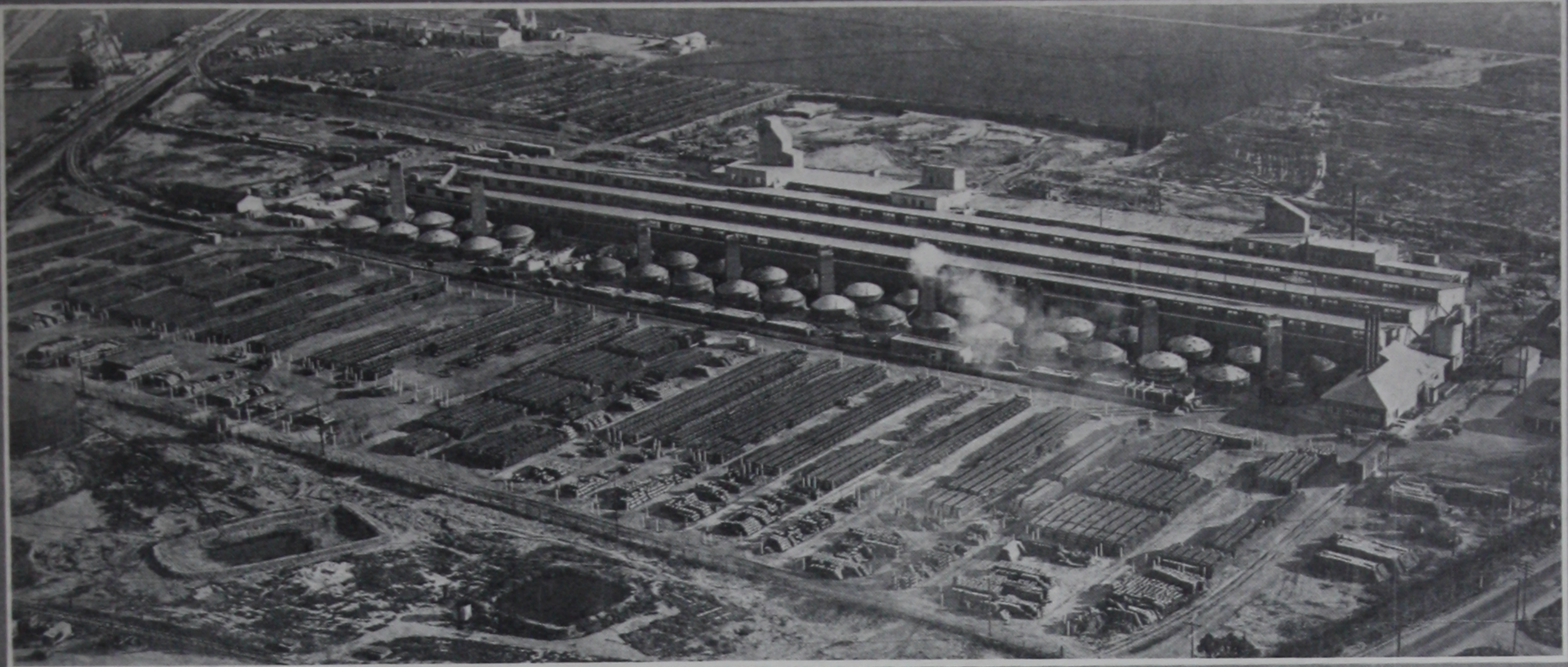
## FILLING

All joints shall be covered with broken rock or coarse gravel before filling in the trench. Filling shall be carefully done until the line is covered to avoid displacing any of the tile.





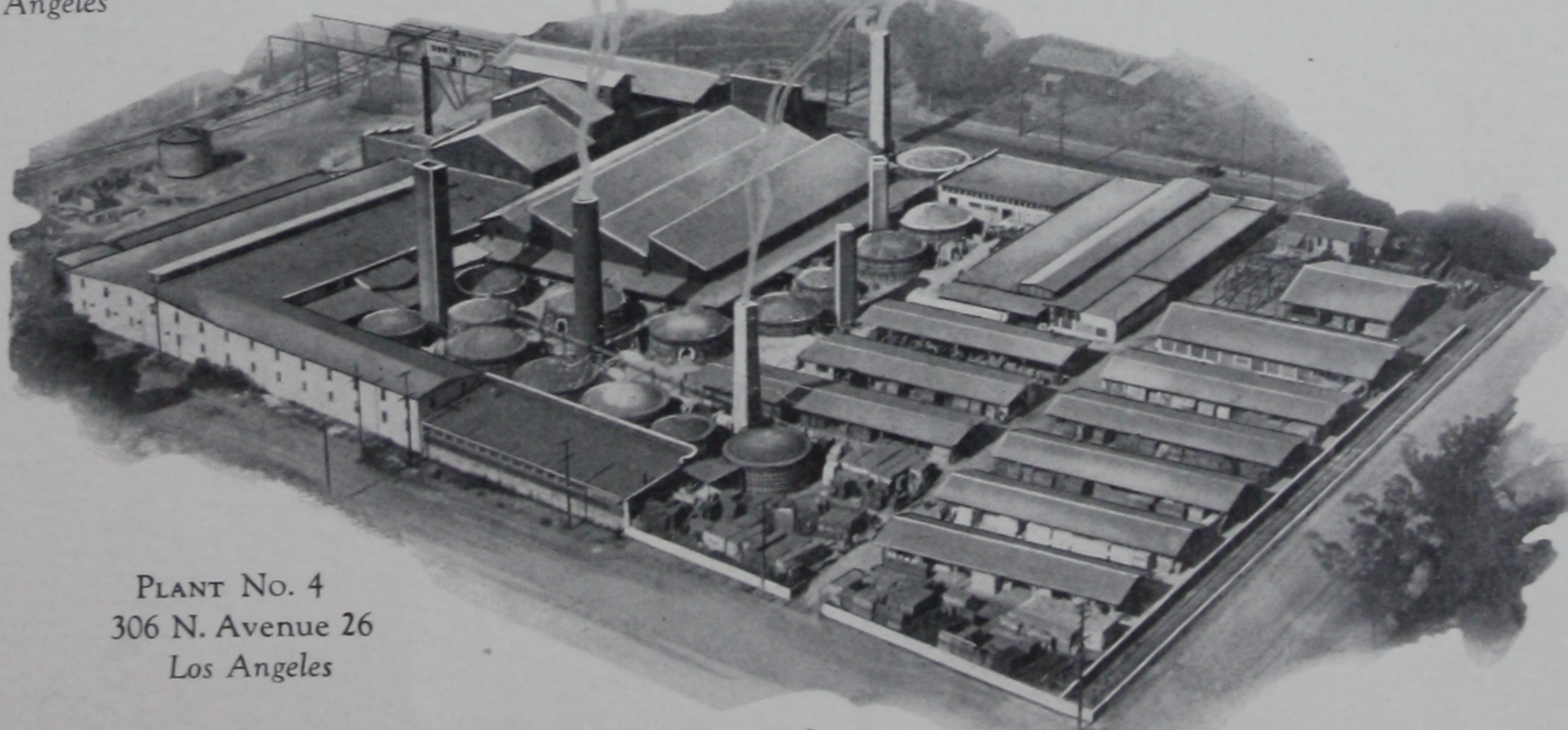
# Plants of Pacific Clay Products



PLANT No. 6  
LOS NIETOS  
California



PLANT No. 5  
Slauson and McKinley Aves.  
Los Angeles

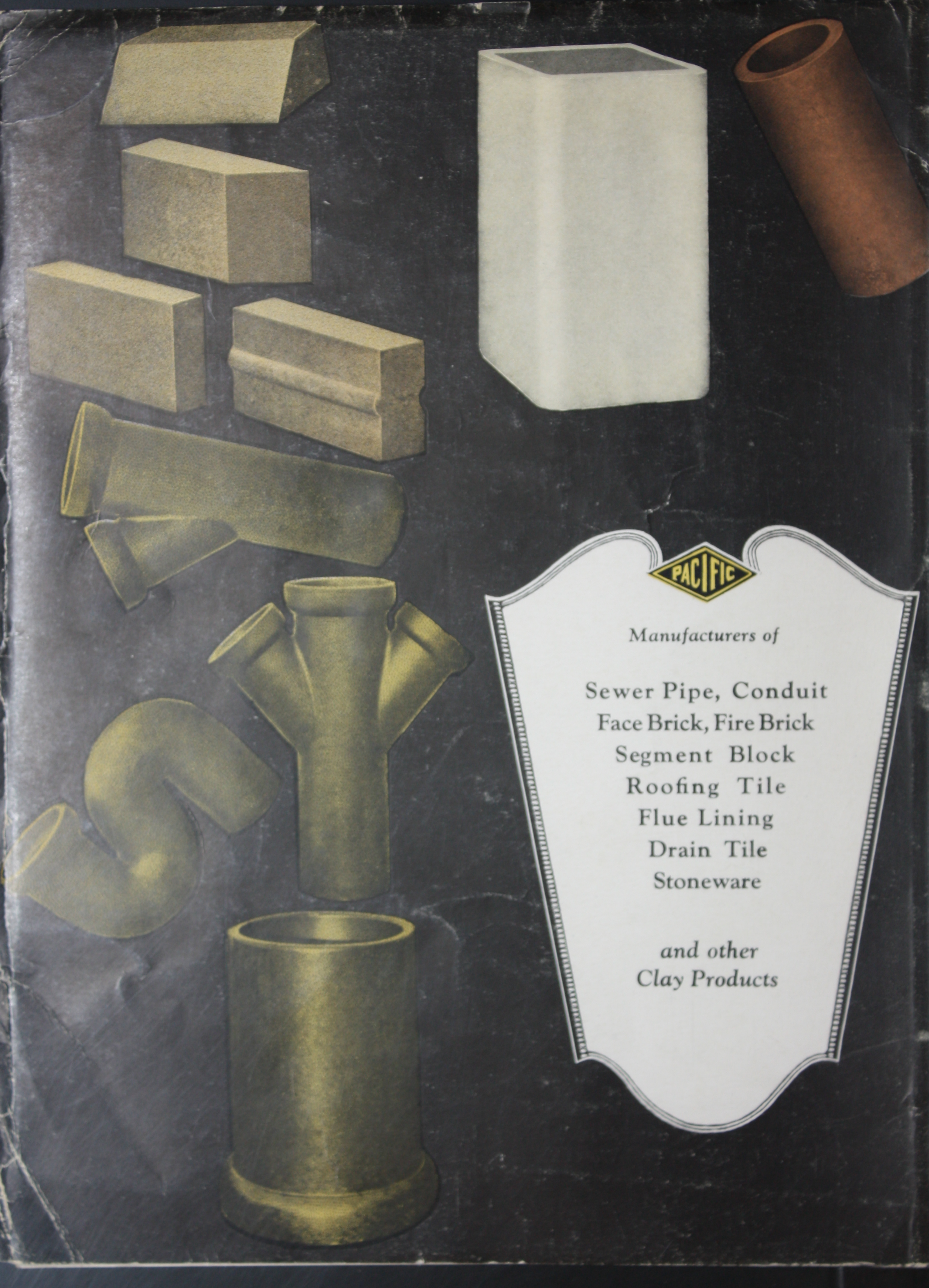


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WEST PICO YARD, 4848 West Pico St. SLAUSON YARD, 56th and McKinley Ave.  
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PACIFIC Face Brick ☐ Ornamental Brick ☐ Roof Tile ☐ Fire Brick ☐ Fire Clay ☐ Flue Lining ☐ Sewer Pipe ☐ Drain Tile ☐





*Manufacturers of*  
Sewer Pipe, Conduit  
Face Brick, Fire Brick  
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*and other*  
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